Auditory Training in the Perkins Deaf-Blind Department

By Nan Robbins

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This book is one of a series of three written by Nan Robbins of the staff of the Department for Deaf-Blind Children at Perkins School for the Blind. The price is two dollars each, or five dollars for the set of three. 2 sets at $5.00 each

No. 21—EDUCATIONAL BEGINNINGS WITH DEAF-BLIND CHILDREN (2nd Edition)

No. 22—SPEECH BEGINNINGS FOR THE DEAF-BLIND CHILD—A Guide for Parents

No. 23—AUDITORY TRAINING IN THE PERKINS DEAF-BLIND DEPARTMENT

A color sound motion picture CHILDREN OF THE SILENT NIGHT showing the work of the Perkins Deaf-Blind Department is also available. The film is 27 minutes in length and may be borrowed for occasional use without charge. Prints may be purchased for permanent possession at $170 each.

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INTRODUCTION

This book deals with one important aspect of a program for deaf-blind children, namely developing to the fullest whatever residual hearing a child may have. As the author points out, almost every deaf-blind child can benefit to some degree from this training. There are practically no children with no hearing sensation at all.

The book is intended for teachers rather than for parents. Inevitably, it uses technical terms, but if you are a parent, we hope you will not be dismayed by this. We suggest that you scan the book if need be, and come back to it for fuller reading later. It contains too many valuable hints for you to be discouraged by coming across some technicalities early in the text.

The author emphasizes that there is much still to be learned about these children, and particularly concerning their auditory losses and the effect these have upon them. Such knowledge as we have been able to obtain so far, she has endeavored to explain. As an addition to the scanty but growing amount of literature in this field, I commend this book.

EDWARD J. WATERHOUSE, *Director*
Perkins School for the Blind

WHAT IS A DEAF-BLIND DEPARTMENT?

What kind of children do we have in our Deaf-Blind Department? What kind of children—and what kind of hearing problems and learning problems should we expect to have?

Current Definition

In January 1954, the National Study Committee on Education of Deaf-Blind Children:

> "Recognizes that there is a wide range of disabilities involved in this double handicap, and defines a deaf-blind child as one whose combinations of handicaps prevent him from profiting satisfactorily from educational programs provided for the blind child or the deaf child."[1]

This definition is obviously very broad. It is the definition which has been used as somewhat of a "legal" guide-line in accepting children into deaf-blind programs. Because of its very broadness and because it describes only two situations into which the child does not fit (and says nothing as to the reasons for his not being able to function in these two situations), the definition has made it possible for children of many different types to be placed together in a deaf-blind program.

By this definition, we can admit almost any child into a deaf-blind program—a child who is, for example, totally deaf and totally blind; a child who is retarded, totally deaf and wears glasses to correct a slight astigmatism; or a child who is autistic, with perfect vision. By present definition of function, we must expect to encompass a wide variety of handicapping conditions.

Size of Deaf-Blind Population

Until about eight to ten years ago, the field of the education of the deaf-blind was a very small and selective one. There were few teachers, few possibilities for getting teachers, no training programs for teachers, and actually very limited interest in the field. Consequently the deaf-blind population in schools was, of practical necessity, very small. Children who could not learn easily and quickly by the Vibration Method were, for the most part, not retained—simply in order to best utilize precious teacher time and energy.

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[1] "Report of the National Study Committee on Education of Deaf-Blind Children." 1953, 1954, p. 28.

Gradually the over-all picture has changed. Here at Perkins, due to our Training Program which makes more teachers available, we have expanded our numbers from 5 students in 1953 to 33 in September of 1963. The expansion of the enrollment potential in addition to the fact of the existence of actually very few truly deaf-blind children—that is, children with specific and selective sensory deficits in vision and in hearing—has changed the nature of the over-all student enrollment. Very simply, with our increase in potential capacity, we began to take children beyond those very limited few who were only deaf and blind, who were socially responsive and who responded readily to instruction in speech and language.

Etiologies and Multiplicity of Conditions

Following are general etiological statistics on the children in our Department during the last two years:

Congenital conditions		26
Conditions requiring incubation, and resulting in RLF	8	
Undefined conditions	10	
Maternal Rubella	8	
Hereditary (genetic) conditions (generally progressive)		4
Adventitious conditions		3
Accident	1	
TB Meningitis	1	
Meningitis	1	
Unknown (due to inadequate history)		4

These are noted only to point out that the very conditions which have been responsible for the handicaps of more than ⅔ of our children in the Department are those conditions which are likely to cause central nervous system damage. We should not, then, be surprised if the greater portion of our children do not act like the traditional deaf-blind child—like the traditional deaf-blind image of Helen Keller—or like children with relatively simple cochlear or nerve deafness. We should expect educationally complicating conditions of the central nervous system.

It seems only to be expected that conditions which cause a child to suffer a severe congenital disorder in both vision and hearing cannot likely be so specific in its effect. In other words, severe congenital cases of auditory-visual deficits are likely to exhibit learning problems above and beyond those to be expected from deficient visual and auditory acuity.

The "dramatic successes" of the Deaf-Blind Department have always been with children who are adventitiously handicapped. Many of these children had meningitis during the first year and a half. It is these children, who, for the most part, have learned to speak very well using the Vibration Technique, have not been behaviour problems, have wanted to learn, and have consistently made progress. It is the congenitally handicapped—of which group the population is tremendously larger—who make up the incidences of diagnostic difficulties and of educational difficulties. But it is also this congenital group who have—in general—never been carried through a long-term educational program from 5 years to perhaps 21 years, as have the adventitiously handicapped children, for the practical reason of teacher shortage mentioned earlier.

Variations in State Facilities: Individual Need

Every year more programs for "special" children are developing: programs for the aphasic, for the autistic, for the slow blind child, for atypical children, for the emotionally disturbed blind, remedial programs for neurological learning disorders, and so on. Some states are providing more of these special facilities than others. What happens to the child whose state simply does not provide facilities for him? Sometimes, we take him.

Our particular physical structure in the Deaf-Blind Department makes it possible for us to cope adequately with a wide variety of language disorders. We have only two students with each teacher. This permits highly individualized methods of teaching. It facilitates building of rapport, decreases the frustrations of competition, allows flexibility of short-term and long-range goals. We also have attendants for the children, providing attention and care 24 hours a day.

Because of these advantages in our program we have occasionally taken a child simply because he merited help or at least an educational trial; and there were no facilities available in his geographical area which could handle him. Whether this is desirable or not, it nevertheless occurs. Consequently, we occasionally have taken children who do not have an educationally handicapping visual deficit in the strict sense of the term—but who do have a language disorder and perhaps a behaviour problem which makes it impossible for them to function in any other setup available to them at the time. So, once again, our boundaries are expanded.

Our role with these children is often a remedial one and always a diagnostic one. A period of time with us frequently readies him for re-entrance or for entrance into a program for deaf children or for another type of program for which he proves to be suited.

The Diagnostic Problem

In attempting to define any population group, one always finds a number who fit easily into the classification, and borderline groups who don't quite fit into our group definition—but neither do they really fit into any other group. It is reasonable that when one begins dealing with more than one of these hard-to-define classifications, the boundaries become even more vague and will encompass an even greater variety of children. One will be considering the borderline children from several groups—the "misfits" who have no group of their own.

Ours is a specialized program. Any child who is referred to us is bound to have multiple learning disorders. These may be sensory disorders, central nervous system disorders of many types, emotional problems. If his learning problems were simple, he would not be referred to our department in the first place. If his problems were not so complex, he would be accepted by and would fit into another group. In other words, our children will not present clear-cut cases of aphasia, or of autism, or of sensori-neural hearing disorder, or schizophrenia, or blindness. To categorize the behaviour, by label, of any of our children is a very tenuous undertaking due to the multiplicity of problems and effects. Every child, for example, is going to have some emotional difficulty if only due to the frustrations produced by his handicaps. Nine out of ten of the children will come from a home environment which one *could* describe as "unrewarding" or reflecting emotional and experiential deprivation to some extent. These superimposed problems tend to obscure somewhat the underlying potential of the child.

Every child referred to us has an auditory-language disorder of some type. The definition of this disorder is clouded by the emotional problems, by the addition of a visual disorder. Labels become vague and one must constantly qualify them.

However, behaviour itself must be understood; the possibilities of the meanings behind particular behaviour must be generally understood. Knowledge of the possible range and variety of auditory disorders is imperative, in terms of the possible range of auditory responsiveness or unresponsiveness. And with this knowledge, concentration should then be upon positive teaching attempts to change observed, inadequate behaviour to more effective behaviour, rather than attempting to ascertain physical or medical reasons for the behaviour or to label the behaviour.

Diagnosis we need; but we need it in terms of daily re-evaluations of changing behaviour under conditions of determined, positive teaching.

Who Are the "Deaf-Blind"?

For these reasons:

—current definition
—etiology
—expansion of Perkins' student capacity
—inadequate state facilities in some cases
—diagnostic difficulties

we find a somewhat heterogeneous group in a "deaf-blind" department. This is inevitable—and acceptable. We propose to accept the variability within the group and to work with each child accordingly.

We must be and are prepared to accept, expect, and work with auditory problems such as those of loss of acuity, auditory distractibility, perceptual problems, problems in interpretation of environmental sound, difficulties in auditory memory, and deficits in retention and interpretation of the spoken word. All of the children who come to us have difficulty in using auditory stimuli profitably —for communication or for broader environmental contact.

Similarly, we must be prepared to expect and work with variations in visual disorders. Our children display a range of visual disorders—from total blindness to poor visual acuity of various degrees, conditions of reduced field, problems in visual perception, or deficits in the area of interpretation of visual images.

Our method of training hearing must reflect this broader way of thinking about the deaf-blind. "Deaf-blind" actually encompasses a multiple number of combinations of auditory-visual disorders of varying degrees of severity. These disorders create serious disabilities in the acquisition of language which require the use of special methods of instruction appropriate to the type of language behaviour displayed.

THE MECHANISMS OF HEARING

To best have a workable concept of what hearing is, we need to replace our thought of "the ear" with the thought of "the hearing mechanism". The normal use of hearing involves adequate functioning of a series of connecting structures: the outer ear, the middle ear, the inner ear, and the brain. Each part of this mechanism—this series of structures—has a different function in the process of hearing. Damage to any one part of the sequence will have a different, adverse effect upon the ability to hear.

The Outer and Middle Ear

Physical Parts:	*Pinna*	*External Canal*	*Ear drum*	*Ossicles (Middle Ear)*	*Eus. Window*	*Oval Tube*
Function:	—Protection —Decreases effect of temperature and humidity —Amplifies 2000—5500 cps. by 5-10db		—Changes pressure variations to mechanical motion —Funnels the motion for greater efficiency for the transfer from traveling in air to traveling in fluid in the inner ear —Defends somewhat from loud noises			
Type of Auditory Disorder:	Conductive					
Common Etiologies:	Congenital atresia; otitis; otosclerosis; perforated drum					
Effect of Condition:	—A person with a conductive difficulty finds merely that sounds do not seem loud enough for him. When sounds are sufficiently amplified, he hears well. —Pure conductive losses can be no greater than 60 db. —Surgical operations are possible for certain conductive conditions.					
Therapy necessary:	—Amplification and temporary auditory training.					

Inner Ear

Physical Parts:	*Round Window*	*Semicircular Canals*	*Cochlea*	*VIIIth Nerve*
Function:	Relieves pressure built up in the fluid.	Responsible for the sense of balance and sense of bodily weight; the fluid is continuous with that in the cochlea.	Mechanical motion is changed to nerve electrical impulses in the cochlea and is carried through the auditory nerve to the brain centers.	

Type of Loss:

—Sensori-neural
  a. Receptor lesion: difficulty in converting mechanical impulses to nerve impulses.
  b. Transmissive neural lesion: difficulty in carrying the nerve impulses to the sub-cortical brain areas.

Etiologies:

—Congenital malformations; drugs; heredity; virus diseases; birth trauma; rh incompatibility; meningitis; maternal rubella.

Effect of Conditions:

—Some frequencies are often heard better than others.
—Recruitment: an abnormally rapid increase in loudness sensation; so that, at a certain loudness level a sound may be very quiet, and at a level just a little stronger in power, the sound may be heard as very loud.
—Variability in effectiveness of amplification, due to the above.
—Distortion of sound: a sound may be able to be heard, but it may not be heard as the same frequency complex which the normal ear hears.
—May vary from a "mild" problem to a "profound" problem, or a total loss of hearing.

Therapy Necessary:

—Therapy is dependent upon the severity of the problem. In mild to moderately handicapping conditions, it may include:
  —Amplification
  —Speech therapy
  —Auditory training

Or, in more severely affected cases:
  —Amplification
  —Auditory training
  —The teaching of Speech and Language by those special methods used for the deaf.

The Brain: Physiological Processes

		Cortex		
Physical Parts:	*Sub-cortical*	*Frontal Lobe*	*Parietal Lobe*	*Temporal Lobe*
Function:	Coordinates impulses; integrates two hemispheres. Center for emotional responses. "Filters out" excess stimuli. All sensory stimuli pass through sub-cortical regions.	Integrates information from all lobes into creation of abstract concepts. Inhibits. Broca's Area: center for uttered speech.	Integration of auditory experiences with other facets of experience—visual and tactual, and so on. Motor component of speech.	Perception; memory of, recognition of and understanding of sound and of speech.

Types of Auditory Disorders:

Sub-Cortical:

1. Central Deafness: Cannot hear; deficiency in transmitting auditory impulses to higher brain centers although they are received in the cochlea. Damage between auditory nerve and cortex.

Frontal Lobe:

1. Expressive Aphasia: A symbolic disorder; an inability to use the spoken word; an inability to produce the spoken word when it is needed although speech of others can be understood. Is not a motor problem but a problem in ideational production of speech.

Parietal Lobe:

1. Central Aphasia: Lacking the ability to internalize experience; sensory impulses are received but are not, in a sense, permanently recorded. An inability to behave symbolically in any way. A deficiency in inner language.
2. "Autism": (See definition in following section. Because autism occurs from birth, we mention it in this section. However, there is as yet no definitive etiology for autism. How much is psychological and how much is pathological?)

Temporal Lobe:

1. Perceptual Disorder: An inability to listen. An inability to direct one's attention to a sound. Auditory distractibility.
2. Receptive Aphasia: A symbolic disorder. An inability to normally understand spoken language—although there is no difficulty in the reception of sound as such.
3. Auditory Agnosia: Very severe, diffuse damage to the auditory cortex causing an inability to attach meaning to any sound although sounds actually do reach the brain and may be noticed by the child.
4. Behavioural Triad: Children with damage in this lobe will tend to be those who are disinhibited, distractible and perseverative.

Etiologies: Anoxia, Rh incompatibility, maternal rubella, birth trauma, encephalopathic diseases, prolonged or precipitous births, premature or prolonged pregnancy, some drugs during pregnancy.

Therapy: Methods of approach will be discussed in more detail later. In general, the experiences presented to the child must be presented in such a way that he can take it in and can make use of it. The difficulty then is not merely an inability to receive the sensation, but, rather, of not being able to react appropriately to the sensation. Techniques for training deaf children are not applicable.

The Brain: Psychological Processes

Parts: The brain and the influence of the environment upon it.

Function: The psychological processes which make learning possible involve the ability to integrate experiences and impressions. These processes, according to Myklebust, follow a certain development. *Identification* must take place; the child must want to be like someone else—like the parent-figure; recognition of a person; response to a person. *Internalization* is the storing of experiences with the auditory component—words and other sounds; you must respond to the experience in order to be able to remember it later. *Imitation* is the desire to actually act like the parent-figure.

A breakdown in these processes interferes with inner language, with the use of language—not necessarily verbal but also nonverbal—for inner thought. Sensations may be received. The central nervous system may be capable of recording, sorting, remembering, recalling. But the psychological processes may break down and the central nervous system, consequently, is not able to work as it is potentially capable of doing. Response to the world is diminished—although the system is potentially capable of responding. The psychological processes involve the normal use of sensation by the central nervous system to make contact with the environment and to interact with the environment.

Etiology: The environment interferes with the development of the psychological processes by providing only deficient opportunity for positive experiences with parents, only adverse conditions—of physical punishment or rejection, of inconsistent handling, of over-protection, and so on.

Types of Disorders:

1. Schizophrenia: Withdrawal from reality after a period of normalcy; bizarre, inappropriate behaviour; relinquishment of hearing in environmental contact; behaviour is subjectively determined rather than objectively or environmentally; complete rejection of human and non-human environment.
    a. Autism: Rejection of human relationships from birth; a type of schizophrenia.
2. Severe anxiety: Obsessions and compulsions; fears; abnormal apprehension; auditory disturbance may be only intermittent and situational.

Therapy:

1. Building of rewarding relationships.
2. Simplification and control of environmental experience to ensure success and reinforcement of useful patterns of behaviour.

Summary

Response to sound, the building of auditory language in general, is dependent upon the adequacy of three inter-related and interlocking systems:

1. Sensory System—where mechanical impulses are converted to electrical impulses which are "the language" of the brain.
2. The Central Nervous System—which ultimately interprets and reacts to the sensory stimulus.
3. The Psychological Processes—which enable the Sensory and Central Nervous Systems to function.

The Sensory System—the outer, middle and inner ear with the VIIIth cranial nerve receives sound impulses and converts them into electrical impulses. Difficulties at this level are properly referred to as the degrees of being hard-of-hearing or deaf.

The electrical impulses are then transmitted into the sub-cortical and then cortical brain areas—*the central nervous system.* Here reactions may be different to sound in general than they are to speech-sound. Difficulty may occur in any of several areas, depending upon the site of the damage or dysfunction—in listening, in directing one's attention to a particular sound, in remembering, in recalling, in remembering sounds with the experiences associated with them, in understanding sounds as symbols for experiences in the past. Brain dysfunction may be a result of inherent, organic deficiency or damage.

The Psychological Processes, of course, take place in the brain also—but they are developed by the quality of the environmental experiences with people. The human child needs an adult to serve as an adequate model for him. If this model is deficient or hostile, the child cannot make proper use of the potential ability of his sensory and central nervous system. Thus, brain dysfunction can be environmentally produced, as well as organically.

Response to sound is altered by interference with any of these areas—but obviously the alterations are different in their very nature and the methods of therapy must differ in certain ways.

THE NATURE OF AUDITORY TRAINING

Damage to any part or parts of the hearing mechanism which is severe enough to cause a disability in listening, in recognizing sounds or in interpreting the meaning of sounds requires special training—auditory training.

Auditory training is the process of learning to use better the potential auditory capacity which you have—whatever that capacity may be. Auditory training is the process of learning to use one's hearing to bring about and maintain contact with the environment and to better understand speech. Auditory training does not mean simply exposing the child to sound. It means helping him to learn to respond appropriately to sound.

Auditory training does not mean simply exposing the child to amplified sounds through hearing aids. Hearing aids are a necessary element in the auditory training program—for some children. Hearing aid equipment is designed only to make some sounds louder. Hearing aids cannot listen, cannot think, cannot react in any way. It is the child—the mind—which must listen, must perceive sound and must learn to interpret it. The child must be trained to make use of this increase of sounds which hearing aids bring to him. Not all children with hearing disorders need hearing aids—since not all hearing disorders are simply those of needing sound made louder. In fact, hearing aids can be detrimental in some types of auditory disorders, as we shall see.

Hearing as a Developmental Process

The use of hearing follows a developmental process. A child must be able to do certain things with his hearing before he can do certain other things. You cannot differentiate between speech sounds before you can differentiate between gross sounds or noises, and so on.

Following are the general steps in the use of hearing:

1. Awareness of sound; almost a reflexive attention to sound.
2. Curiosity about sound and its sources; some idea of sounds being different, leading to a curiosity about what makes sounds happen.
3. Recognition of differences between sounds; gross discrimination.
4. Remembering sound; building of associations; linking of

sounds with their sources, with their producers (actions, objects or people).

5. Using auditory stimuli meaningfully and spontaneously, as clues to happenings in the environment, and forming appropriate responses to these clues (assigning of meaning and association of the consequent response).

A parallel development takes place in relation to speech-sound:

1. Awareness of speech as a noise.
2. Curiosity about sound, and a realization that speech-sound is made by people.
3. Recognition of some differences between speech sounds—tone, rhythm, length of sequence, vowel differences, and so on.
4. Remembering sequences of speech sounds; beginning of association building; understanding speech.
5. Recalling sequences of speech sounds in meaningful association: talking.

Why Train Hearing?

The rate of progress in auditory training and the ultimate gains are seldom predictable due to a composite of factors. Successful use of hearing is greatly dependent upon the part of the hearing mechanism which is damaged or in dysfunction, and upon the severity of that damage. The adequacy of the training which the child receives is important, as is the appropriateness of that training for his particular hearing deficit. Other determining factors are the age at onset of the disorder and the stability of the disorder, the intelligence of the child, his personality and emotional maturity, the ingenuity of his teachers, and the adequacy of amplification for his condition.

Evaluation of progress then should be thought of in relation to the total status of the child. Any positive change in auditory response is significant progress and merits striving for further change. We cannot turn a hearing handicapped child into a hearing child. However, most hearing handicapped children can be helped to use more efficiently the hearing capacity which they have available to them.

Keeping the individual differences always in mind as limiting the child's possible achievement, we work toward several general objectives in which lie the ultimate benefits of auditory training:

1. Awareness and recognition of gross auditory stimuli, even

to a very limited degree, brings the child into increased contact with his environment, thus decreasing his isolation somewhat, and increasing the quality of his experiences. If the child is totally blind or has a severe visual defect, use of the auditory is especially vital in extending him beyond the range of his tactual contact, thus enriching his concept of space and extending him outward from himself.

2. The assigning of meaning by the child to a variety of environmental sounds helps him to cope better with his environment. Some sounds may be warning signals. He may be able to anticipate happenings more readily.
3. Recognition of meanings of gross sounds can aid him in his travel if he has no sight. Sounds are clues to where you are.
4. Training of hearing is vital to the development of communication. Speech is sound. If hearing can be trained to apprehend speech-sound to any degree, the advantage to communication is tremendous. For those with poor hearing but with residual hearing, speech perception will be improved with the addition of auditory clues to tactual and/or visual ones. Hearing becomes a supplementary sense. Intelligibility of speech will be increased. A more natural voice quality may be achieved. And, even for the profoundly deaf, more rhythmic speech is a product. In the cases of defective processes beyond the reception and transmission of sound, training may help hearing to become a primary avenue for understanding speech. Whether hearing becomes a primary or secondary avenue of learning, it can be utilized with nearly every auditorily handicapped child to some advantage in his understanding of speech and in his learning to speak.
5. As a result of improvement in speech perception and speech production, and as a result of extended sensory experience and of increased contacts with people and happenings through the employment of another sense, a broader and more flexible language development is brought about. Improvement in the vehicle of language is bound to facilitate the use of language itself.

Speech is sound. Hearing is a distance sense. For these reasons, every effort should be made to utilize and develop any auditory potential which may be available.

Whose Hearing Can We Train?

Every "deaf-blind" child must be given the opportunity to participate in a continuing auditory training program suited to his individual ability and needs. Very nearly every peripherally deaf child has at least a small amount of residual hearing which can be trained for greater usefulness to him. The same is true for "deaf-blind" children. A child who can learn to notice only the presence and absence of sound is in a better position than before, if he can learn to use this ability constructively. It is, perhaps, those very children who use their hearing least—who seem to be most deaf and most distractible—who need most the opportunity to improve their response to sound.

Deafness and Auditory Training

Potential usefulness of hearing cannot really be predicted from an audiogram. However, one can expect certain types of responses from certain types of audiograms. We can divide the children with peripheral hearing losses who can profit from auditory training into several broad classifications determined by the degree and pattern of hearing loss. These are listed as follows with a general statement covering the ultimate functional use of hearing to be expected with each.

40-60 db loss: moderate: These children can learn to appreciate and understand a great deal of speech and language through the use of amplified sound. Perception of environmental sounds is good and useful to them. The auditory is a primary avenue of learning.

60-85 db loss: severe: These children can be helped to discriminate between some speech sounds, appreciate voice quality, accent, rhythm, and inflection patterns through the use of amplification. They cannot generally learn language or speech without the use of special educational techniques. Except at the very upper limits of this group, the auditory sense is a secondary avenue of learning, and as such must be trained carefully for greatest usefulness.

85-100 db loss: profound: These children can often discriminate between some vowel sounds. They can be taught to listen for rhythmic patterns of word and sentence stress, accent and inflection. Their limited residual hearing is slower and more difficult to train. It can be minimally but significantly useful to them in speech. It is useful in establishing environmental contact. The auditory sense must definitely be trained to usefulness, to awareness, in these children, rather than leaving it to chance. Without training—and with poor sight—the habit of ignoring sounds may easily be acquired.

"Totally" deaf: It is a rare child who has absolutely no potentially useful hearing. But even this rare "totally" deaf child can often profit, psychologically, from receiving the occasional impact of sound (the kinesthetic impression) and thus be able to note a difference from utter silence.

"Ski-slope" pattern: We very often encounter hearing which is near normal in the lower frequencies and sharply—but gradually—drops off as it moves to the higher frequencies. This child will be primarily auditorily oriented. He will be able to know that sound is happening almost always. If he can tolerate amplification, his discrimination can be improved somewhat—but he will never be able to discriminate perfectly. His loss in the higher frequencies makes it impossible for him to be aware of many of the distinguishing characteristics which make one sound easily recognizable from another. He may seem to hear very well—because he always knows that sound is happening. He has much more difficulty than is superficially apparent.

"Islands" of hearing, at 250 and 500: We frequently encounter children with only minimal hearing at 250 and 500 cps. These children can often develop an awareness of vowel sounds—but cannot discriminate between them. Consequently, they often can become aware of the rhythm of speech. Similarly, their hearing is of minimal use environmentally—but can help them to be occasionally aware that a sound has happened.

Auditory Agnosia and Auditory Training

We often see children who appear almost too deaf to be deaf. We have already stated that very few children with peripheral hearing deficits are absolutely totally deaf. Also, these peripherally, very deaf children who are, in addition, blind will compensate for the lack of these two sensory abilities by utilizing the sense of touch. The child, then, about whom we are talking when we talk about "auditory agnosia" or the child who is "too deaf to be deaf", is the child who appears to not hear, but who also does not really compensate for this apparent lack of hearing through special use of his sense of touch. After careful observation in everyday environmental situations over a period of time one begins to notice that he occasionally appears to have heard a sound, only moderately loud, but has perhaps only responded by momentarily ceasing his movements. He seems to be deaf, but we really don't quite believe it.

In these cases, sound may be arriving at the sub-cortical level, or even at the cortical level, but no use can be made of it. So there appears to be little awareness of sound. His problem is not one of hearing but of reacting to what he hears.

These are difficult cases—but perhaps not hopeless ones. Training can attempt to create an awareness of sound and a set of conditioned reflexes to some sounds which could be useful. Actually, one is not certain just how far training can go with these children. These are probably the children who, in the past, have responded not at all to conventional auditory training, and so have been dropped rather soon from the auditory training program. Perhaps by approaching them with a different point of view and with a different set of expectations, we can help them to go farther in their use of hearing.

A Perceptual Disorder

An auditory perceptual disorder involves an inability to listen —an inability to focus one's attention on the sound which is important at the moment. One could describe it as an inability to make one's hearing listen—which is completely out of one's control. It is quite like having the dial on the radio, to which one is listening, constantly turned.

The child may be quite engrossed in listening to you talk to him; suddenly he hears the airplane outside, and listens very hard to it. He then hears someone cough in the next room, and again he hears your voice. Then he listens to the clock. And so on—from one sound to another to another. And he, of course, finds learning difficult because he can't make his ears pay attention for any length of time.

You play a record for him and he listens to the scratch of the needle. In a noisy place, he is apt to get very excited, because there are so very many noises around him—all of which he has to attend to because he cannot do otherwise.

Perceptual difficulties can be helped by auditory training. Without training, hearing becomes almost a nuisance to him—a distraction. At first, outer controls in training help him to use his hearing more efficiently. With this positive practice, habits are established which later permit him to control his own hearing better. Outer control, crutches of various sorts, lead later to inner control.

Defects in Auditory Memory

An inability to remember sounds in sequence or an inability to reproduce sounds in sequence obviously interferes with the learning of language. Words are sounds in sequence. Sentences are even more complex series of sounds in sequence. This ability to remember sound patterns can be trained.

The Aphasic-like Child

We will not likely encounter a simple aphasic child in our "deaf-blind" group. The problems of brain damage which we encounter are more diffuse. However, in order for us to understand the problems of our children, we must keep in mind the concepts of receptive and central aphasia.

We do see children who have adequate auditory perception, adequate discrimination for speech sounds, but have difficulty learning oral language in spite of this. These children often have adequate auditory acuity. The problem in auditory training becomes one of organizing the auditory stimuli which are presented to them. We must structure, control, and simplify their auditory environment in order for them to be able to use the auditory stimuli. We must control the auditory environment in order for the child to be able to make associations using auditory symbols.

When Do We Begin Training Hearing?

For maximum utilization of hearing potential, for ease of training, and for really worthwhile results, training of hearing should be started as early as possible for each child and should be carried out continuously throughout the child's period of education at the school. If auditory training of the deaf child is neglected until after speech habits are established, the results of training are most often minimal ones due to the added difficulty of breaking habitual patterns of sensory adjustment.

Frequently, children with severe peripheral hearing losses in combination with visual losses may acquire the habit of disregarding sounds unless they have the benefit of amplification and auditory training. This occurs for two reasons. Firstly, in order for sounds to be audible to him they must be louder than for the ordinary person. Therefore, he has not the normal number of opportunities for learning about the sound. He has not the usual number of repetitions of the sound.

Secondly, his visual handicap makes it difficult for him to attach meaning to those sounds which he does incidentally hear. He may hear a sound but, being unable to see and being very often limited to arm's length in making contact, he may be completely unaware of the source of the sound and unaware of the effect of the sound. He needs to be taught about sounds in a well-structured manner. It is true then that deaf-blind children often, with training, prove themselves not to be as totally or as severely deaf as they first appeared to be.

A normal baby is being stimulated auditorily from birth. We must try to approach this when dealing with auditory disorders. But, in attempting to do so, we must also remember that the auditory stimulation must be presented in a way which the particular, individual child can make use of. An uncontrolled auditory environment can be merely chaos for him.

How Do We Train Hearing?

Training of hearing is carried out simultaneously in three general areas of auditory perception: 1) gross and environmental sound, 2) music, and 3) speech perception. The method of development in each of these areas is essentially parallel.

Recognition of and responsiveness to a sound or sound pattern is trained through careful, deliberate, planned demonstration of sound and sound-source, through repetition of the sound experience, through experiencing of contrasts—all of which is carried out in a manner pleasurable to the child.

Training proceeds along two lines from the very beginning:

1. Formal lessons designed to establish listening habits and to encourage growth in the process of listening, discrimination, and interpretation.
2. Use of every natural opportunity for reacting to sounds during the day, whenever the occasion presents itself.

At the beginning, formal lessons must be structured carefully to develop an awareness of sound and a curiosity about it, as well as rewarding experiences with it. As the curiosity develops and as discrimination begins in each of the areas of training, less stress is placed upon formal lesson periods as such, and hearing simply becomes another meaningful, sensory avenue for learning. In other words, auditory training gradually leads to a method of learning—the utilization of all residual sensory capacities in reacting to the world.

With the exception of a few very special cases which we will discuss later, every new auditory situation is presented as a multi-sensory experience (visually—if possible—tactually and auditorily) until a response to the multi-sensory impression is forthcoming, that is, until the multi-sensory situation or impression becomes meaningful and brings forth an appropriate reaction. It is only after this initial introduction that attention is directed to the auditory component in the situation. The auditory stimulus is then experienced repeatedly in isolation, and a discriminatory response is eventually attempted, based upon the auditory in isolation. If the child is not capable of a response to the auditory alone, a return is made to the multi-sensory approach. If the child *can* respond to the auditory alone, he is given more practice in doing so in order to fully establish the response. The re-integration of the auditory with the other sensory clues will then be a more knowing one than it was initially. The auditory will be more meaningful in itself. The child will be more auditorily aware. The entire experience itself will be richer, more complete.

AMPLIFICATION

What a Hearing Aid Can—and Cannot—Do

Hearing aids make sound louder. They do this in a peculiar way. All frequencies are not amplified equally. Most hearing aids emphasize the frequencies between 750 and 3000 cps., with the maximum amplification at 1000 to 1500. The nature of the apparatus then always produces some distortion to sound. Sound through a hearing aid is not merely sound, as we hear it, made louder; its characteristics are changed somewhat by the very nature of the amplification process.

A hearing aid is not selective in its amplification. It cannot sort important sound from unimportant sound. It cannot sort background sound from foreground sound. The hearing aid brings more sound to the ear and louder. It is the task of the brain to deal with this sound—to sort it, to listen to it, or to not listen to it, to interpret it, and so on.

A hearing aid produces a range of loudness variations comparable to those received by the normal, unaided ear up to a point. However, each hearing aid has a maximum output of power above which it cannot be forced. Very loud sounds, when amplified, are compressed or "clipped" in order not to exceed this maximum output. Maximum power output varies with types of hearing aids, making some more suitable for mild, moderate, severe losses, and so on.

Who Should Be Fitted with a Hearing Aid—and When?

Hearing Aids for Peripheral Losses

Only children who need to have sound made louder in order to receive it should be fitted with hearing aids. These are children with peripheral hearing disorders. And every peripherally deaf child, who shows any evidence of even minimal residual hearing and can tolerate amplification, should be fitted with a hearing aid just as early as possible. The longer he has been hearing and the more he has been hearing, the faster he will talk. Children with peripheral hearing disorders *and* severe visual deficits need amplification even more urgently in order to, as early as possible, establish contact with the outer environment—the distant environment.

As soon as a reasonably reliable diagnosis of a peripheral hearing disorder as a component of the child's problem can be made—or as soon as positive response is obtained with the group hearing

Hearing aids help some children who show diminished response to sound but they do not help all children. A hearing aid can only amplify sound. A need for louder sound—for increased physical power of sound— is not always the reason for deficiency in or absence of response.

aid—and as soon as the child will tolerate amplification psychologically, he should be fitted with a hearing aid.

Hearing Aids and Severe Central Disorders

Probably the most difficult diagnostic problem with multiple-handicapped children is ascertaining the presence or absence of a mild to moderate peripheral hearing disorder in a child who also has a central nervous system disorder of a rather diffuse nature. This child may respond to sounds of rather moderate intensities (around 50-60 db.) by scanning. He is hyperactive, most likely—or he may be rather withdrawn and oblivious to the environment in general. He is a behaviour problem. He may be self-destructive to some degree.

Hearing aids can eventually cause damage to an end organ which is actually intact. Also, hearing aids do not produce natural sound. For these reasons, it is advisable to establish auditory contact with these "questionably deaf" children first through the unaided ear. In this way auditory potential can more safely be evaluated. And the training for the use of sound provides a basis for easier acceptance of amplified sound later—if it is later deemed necessary. In other words, where a definite diagnosis of mild to moderate peripheral loss *cannot* be made,—rather than fitting a hearing aid,—diagnostic, unaided, auditory training should be employed until such time as a more accurate estimate can be made after a positive response to sound has been achieved.

Hearing Aids and Auditory Distractibility

The child who is hyperactive, highly auditorily distractible, with a mild to moderate peripheral hearing disorder presents another problem. The hearing aid may cause him to be even more distractible—although it does, in theory, enable him to make finer discriminations. In this case, the auditory environment should be controlled—and the extent of the control will depend upon the severity of the child's problem. It may be that he should not wear an aid until he can learn to respond more appropriately and more selectively to sound—if his hyperactivity is really severe and if it increases drastically with the use of the aid. Or, he may wear his aid, at first, only for short periods of carefully controlled sound experiences. But, more usually, the auditory environment, initially, must be structured in those ways discussed later under "Auditory Distractibility". The auditory environment must be controlled so that he can learn to make use of the amplified sound which he actually needs.

Hearing Aids and the "Sloping" Loss

The child with a steeply sloping peripheral loss may present a problem in feasibility of amplification. The difficulty may occur because of the near normal hearing in the lower frequencies. With amplification, the lower frequency sounds may become annoying or intolerable. However, this appears to be more of a problem with adults than it is with children.

To us, the steeply sloping peripheral loss in combination with a severe visual deficit presents more difficulties in early diagnosis than it does in amplification. These are the children who appear to hear well. They hear sound happening most of the time in most situations. And to test their discrimination ability in the non-verbal period, or when they are characteristically reticent or withdrawn, is a tenuous undertaking. One should be alert to the possibility of a high-frequency loss in seemingly "hearing", non-verbal, visually handicapped children.

Trial Amplification

Once the existence of a definite loss of auditory acuity is established, response to amplification can really be determined by trial. One may obtain two audiograms on older children which are identical pictures; but one of these children may respond to amplification and one may not.

If the child is destructive toward his aid—ripping it out of his ear, banging it with his fist and so on—respect this so far as to re-evaluate the situation. He, quite obviously, is not ready for an aid at that moment, and being approached in that way. Something is wrong—perhaps psychologically, pathologically, or diagnostically. Do not force it. Re-evaluate.

Introducing the Child to the Aid

The teacher should introduce the hearing aid to the child with some caution. Some children readily put on an aid, smile broadly at the new, wonderful sound, and proceed to wear it throughout the day from that time on. Some simply tolerate it—without smiling broadly—and often never profit from it. But others are not quite so easily accepting.

We often encounter children who do not easily accept new things, changes in routine, and so on. If he does not accept the aid immediately, it is sometimes helpful to place only the button without the earmold at the child's ear for a brief period while singing or making sounds which he enjoys. Or, the teacher might wear the aid for a time, eventually inviting the child to try it. It may be necessary to gradually increase the length of the periods during which he wears it until he can happily tolerate the aid for the entire day.

Responsibilities of the Child

As soon as the child is presented with the aid, he must be taught to begin to assume some responsibility for it. The following are expectations which must gradually—over a period of years—be taught to the child so that he may learn to carry them out—at first, under your guidance and watchful eye and, later, independently.

1. Put in his earmold.
2. Turn the aid OFF when he removes it.
3. Turn the aid ON when he puts it on.
4. Put it on in the morning in a habitual way as a part of getting dressed.
5. Indicate when the aid is not working.
6. Adjust the volume.
7. Remove it when engaging in athletics or rough play.

And, later, at a "high school" level and beyond, he should learn to:

8. Clean his earmold.
9. Regulate the Volume and Tone Controls to his best advantage, if necessary, as situations change during the day.
10. Replace batteries.
11. Note trouble signs and make very minor adjustments to aid, such as trying a new receiver or new cord.

General Care of the Aid

We shall discuss the care of the hearing aid with the body worn aid in mind—the Zenith Regent in particular, simply because so many of our children happen to use this aid at this particular time. Other body worn aids are similar in general make-up.

Few of our children use the behind-the-ear aids, primarily because the children who need aids in our group generally require more power than can be secured through these models. However, it should be noted that these may be extremely useful to the blind child with a binaural,—mild, to moderate—peripheral loss because of the advantage to him in terms of localization of sound which may be possible through placement of the microphone at "ear-position".

The hearing aid should be checked daily to see that it is working properly. The teacher may do this most easily by removing the earmold, placing the receiver at his own ear, and speaking into the "mike". Older children will, of course, be responsible for checking their own aid and reporting malfunctions.

Mechanical Protection:

1. Protect from excessive heat or humidity. Do not leave in hot sun or near radiator.
2. Cords should be worn with enough slack to avoid strain. Discourage the child's playing with the cord, winding it, chewing on it, and so on.
3. When disconnecting cord, pull the terminal; do not tug on the cord itself.
4. Remove aid during rough play.

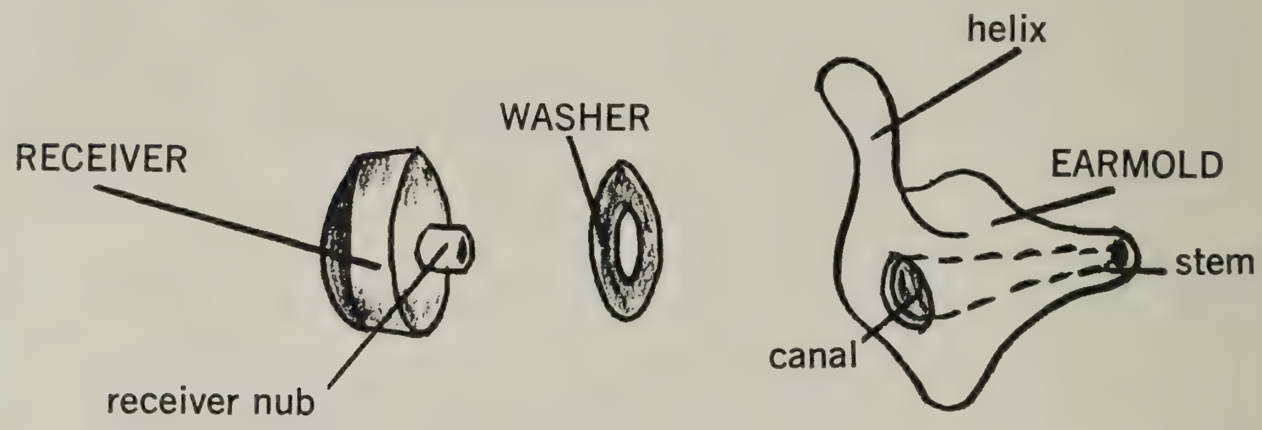
Wearing of Aid:

1. The aid may be worn in a pocket (securing the garment clip so that it will not easily slip out), attached to a girl's undergarment, or in the hearing aid carrier. If possible, the microphone should not be covered by clothing; the carrier is most effectively worn over the shirt or dress. However, one should always also weigh the value of cosmetic appearance to the individual child.
2. Arrange the aid in the carrier so that the cord runs along the bottom and side of the aid rather than in front; if the cord runs in front of the microphone, scratching noises may occur.
3. The aid is most advantageously worn by young children on the side of the body opposite the ear for which it is fitted. The cord crosses over the shoulder and goes across the back of the neck up to the ear.

Use and Care of Earmold:

1. The plastic earmold is individually molded to the child's ear. It is not interchangeable between children. It must be replaced periodically as the child grows. The mold is made for one ear only, and is, of course, *not* interchangeable between the two.
2. To insert: Put stem of earpiece gently into canal of ear; at the same time, pull top of ear gently upward and back.

Insert slowly. Then twist slightly backward and forward to fit the helix into the contour of the ear.



Receiver—Earmold Unit

3. Clean frequently so that wax does not plug the canal of the earmold. The earmold snaps on to the receiver nub. The earmold may be washed regularly with warm water. Rinse, dry thoroughly and blow the water out of the canal. Pipe cleaners are helpful for cleaning and drying the earmold canal.

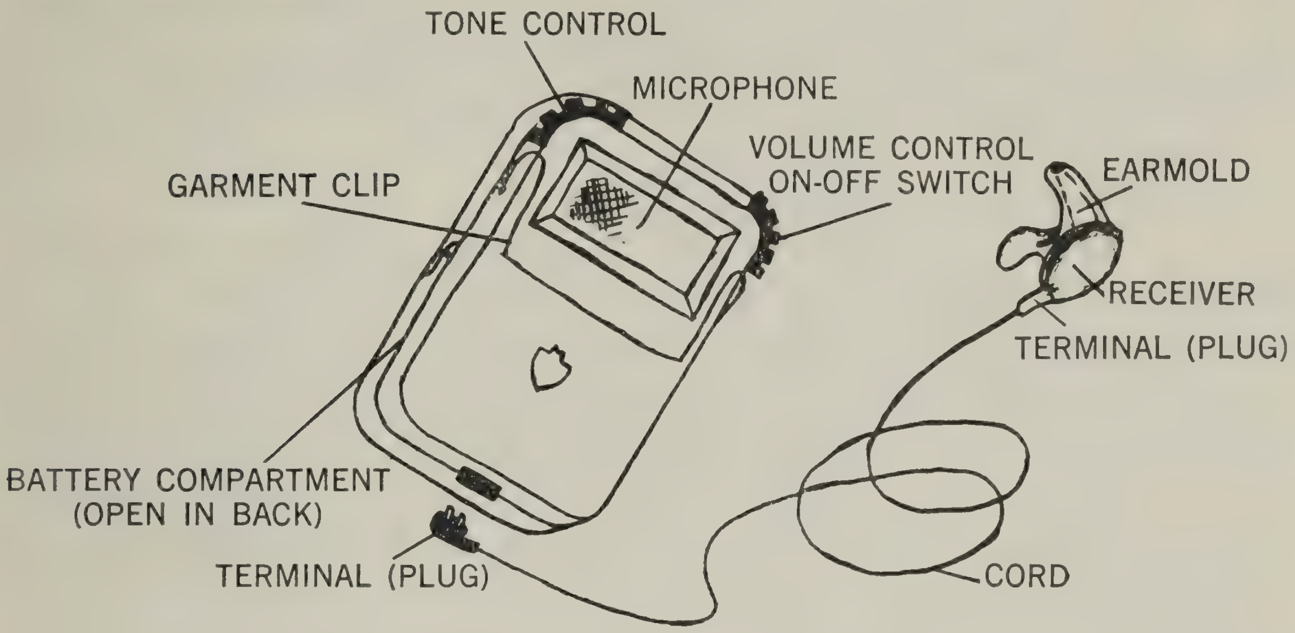
Tone and Volume Control:

1. Tone Control: This dial modifies the quality of sound somewhat by bringing about changes in the frequency range of the aid. On the Zenith Regent for example: F position—amplifies full range of sounds covered by the instrument; H position—emphasizes the high tones by cutting down the lows; M position—amplifies the medium tones without undue emphasis of highs or lows; L position —boosts the lows by cutting down the highs.
2. Volume Control: This dial turns the aid OFF and ON and regulates the degree of amplification given. It should be turned up no higher than necessary, for reasons of economy and also because increases in power may produce more distortion of sound.

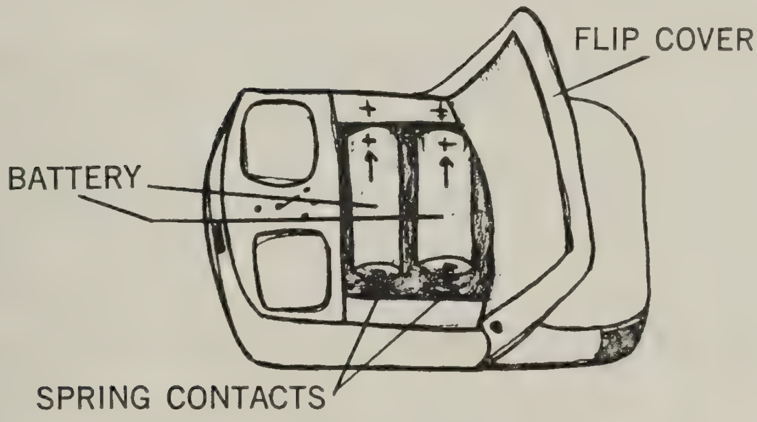
Care of Batteries:

1. Precaution: Turn the instrument OFF when it is removed. If left on overnight for example, the batteries run down quickly. "Dead" batteries should be removed immediately to avoid leakage and corrosion. If the aid is not to be used for a day or more, remove the batteries.

2. Installing batteries: Place the + sign on the battery toward the + sign on the battery compartment.



Hearing Aid (exterior) Zenith Regent



Hearing Aid—Battery Compartment

Trouble Signs:

For the most part, difficulties with an aid will be reported rather than coped with by the teacher. However, a few words might profitably be said about two items which the classroom teacher encounters very frequently.

1. "Squeal": This can be caused in several ways with which the teacher should be familiar.
   a. Poorly fitting earmold, or an earmold not correctly placed in ear.

b. Improper fit of receiver to earmold; "washers" may help.

c. The volume may need to be reduced somewhat; this may be true particularly on a small child with a very powerful aid, in which case the distance between mike and receiver is small. Move the mike farther from the receiver if possible.

d. Adjust the Tone Control.

e. May occur if receiver ear is close to wall or a large flat surface.

2. Broken or worn cords: A slight break in a cord will cause the aid to give intermittent reception—cutting "out" and "in". This can be checked by running your fingers along the cord and rolling it back and forth; if crackling is heard, or if it "cuts out", the cord is worn or broken and should be replaced.

The Group Aid

The Group Aid versus Individual Aid

One should compare the advantages of the group aid to those of the individual, wearable aid with reference to the needs of the particular child in a particular activity. Because a child has his own hearing aid, we must not neglect the possibilities which the group aid can offer to him.

The group aid gives the advantages of less distortion, better fidelity, binaural amplification, and better performance under noisy conditions.

Some thought should be given to the problem of noise when using any type of amplification with a child. The noisier the environment, the harder it becomes to distinguish speech—to separate speech from the background noise. We encounter the external noise of cars, trains, working men, and so on. There is the noise coming from the next room, from the heating system, from shuffling feet, and so on. Some of this can be controlled. Hard surfaces cause sound to bounce or reverberate, which interferes greatly with intelligibility. This echo can be reduced by the known methods of soundproofing and is also reduced by the use of the group aid. "Echo" decreases somewhat with the nearness of the speaker to the microphone. The group aid has the advantage of the teacher's wearing the microphone around her neck, so that she is a constant 12″ or so from it.

It is frequently advisable to begin auditory training with the group aid, working up to the fitting of an individual aid. It is, practically speaking, not as easily destructible as in an individual aid. And the advantages mentioned above may help the child to more readily accept sound.

However, the group aid is restricting to movement, and for this reason may not be easily used for any length of time with small, active children.

Amplification Settings

The concept of optimum listening level is important for obtaining maximum benefit of amplification equipment. Tolerance for loud sound varies. Discrimination does not always continue to increase with increases in loudness; discrimination may actually decline after a certain loudness level is reached.

Tolerance levels can generally be raised—over a period of minutes sometimes, and over a period of weeks in other cases. This is sometimes a psychological reaction. And at other times, it may be a pathological reaction. The teacher must be aware of variations in tolerance for sound from child to child and should proceed cautiously. Dale (4) makes the following suggestions:

—The average pure tone level plus 10-15 db should be the introductory setting for the group aid.

—Group aid settings are given in relation to a scale different from that of the audiometric scale. Therefore, about 15 db should be subtracted from the group aid settings on the dial in order to compare it with the pure tone, audiometric figures.

—Depending on the child's reaction, over a period of days to weeks, increase the intensity until it reaches 30 db above his pure tone threshold. Always assess the reaction.

—Profound losses generally function best at the loudest level they can tolerate.

RANDOM, GUIDING THOUGHTS

A child who is incapable of *hearing* a particular sound stimulus cannot possibly be expected to learn to respond to it! Very nearly every child can become more sound conscious and can learn to respond meaningfully to some gross sounds. But the ability to go further than this in making discriminations depends upon the child's individual situation.

In formal exercises with sound, minimize the showing of disapproval of incorrect responses. Demonstrate again for him the sound and sound-source pattern. Teach him, so that he can respond appropriately. An incorrect response means that he does not understand; he does not know. Your job is to teach him, to help him to respond correctly. Your job is not to merely disapprove or punish him for not knowing.

The child must in some way achieve success in working with sound in order for him to put forth any effort. If he never understands, if he always is wrong, how discouraging the periods can be. Success comes through incorporating activities which he can do with activities which he is learning to do. The rule: a bit of the known with the unknown.

Be careful to work for recognition through hearing alone only with those children whom you believe can respond to this limited presentation successfully. Do not request a pure auditory response until the child can invariably respond in some knowing and positive way to the particular stimulus through the combined senses—vision, touch, hearing, and kinesthesia.

In the beginning formal exercises, a few minutes several times a day is much more effective than one long period. The child must be gradually introduced to sound and must find listening a pleasurable experience—not a boring and tiring one.

As soon as auditory discrimination in speech has begun with success, auditory training is incorporated with the curriculum as a whole, by devoting a minute or two at very frequent intervals throughout the day to focusing attention upon the auditory aspect and to give opportunities for auditory discrimination.

When doing formal exercises, especially at the non-verbal level, be certain that the child understands what response is expected of him. The activity must be clear to him, and before this it has to be clear in your mind. What do you want him to notice? How are you going to draw his attention to it? And how is he going to tell you that he has noticed?

Work for an immediate response to auditory stimuli. Avoid allowing auditory indifference to develop. The child must learn to listen, think and react. He must not get into the habit of ignoring sound in any way.

Many, many experiences with a sound are necessary before that sound can be remembered and recognized. Since many experiences of each type are necessary before an auditory concept is established, the teacher must exercise her utmost ingenuity in devising ways of presentation which will sustain the child's interest and fascination.

Build on what he can do and will do pleasurably.

Concentrate always on change. Concentrate on progress. There is a danger in being so very pleased with a child's newly learned response to a sound, that the teacher hounds him with it interminably in the same way. Once he learns a response, move on. Build on the learned response in some way. Refine it.

Every response which a child makes—right or wrong—is a learning response. If he responds inappropriately, he is learning—but he is learning poor or "wrong" responses. The task of the teacher is to help the child to make sufficient "right" responses to a sound so that he learns the right response and can then make the right response consistently on his own when presented with the sound-situation.

CONTROLLING THE AUDITORY ENVIRONMENT

When we begin to train hearing—actually when we enter a "deaf-blind" child in an educational program—we are making available to him an environment of sound. We can control this environment to a great extent, directly. We cannot directly control his reactions to it. How much should the presentation of sound be controlled? How can we control it? What kind of sound-environment do we want to involve him in?

We have two approaches to the presentation of an environment of sound. One approach, we call: structured; the other: saturated. In a sense, these are opposite points of view. In beginning on a program of training the hearing of a child, one must determine in which of the directions one is going to lean—and how far the inclination will go.

Saturation

By saturation is meant the creation of a sound-filled environment. The more opportunities to hear sound which the child has, the better acquainted he will be with sound. Saturation in speech training implies "Talk. Talk. Talk." A child who has more opportunities to hear speech sounds more times will remember these sounds better and will simply become familiar with more sounds sooner. It implies enrichment of the auditory environment.

This approach assumes that the child is "reasonable". It assumes that he can listen. It assumes that he can make some sense out of sound himself. It assumes that he is aware of sound, can sort out sounds, and make associations with sounds somewhat from the beginning. He makes sense out of those sounds which he can hear, with, relatively, a minimum of help from us.

Structure

By structure, on the other hand, we mean that we control the presentation of sound. We limit the sound which is available to him. We predigest sound for him. We set up associations for him. We simplify the environment of sound. Through structure, the world of sound is organized for the child by us. He is not able to cope with sound in one way or another. We present sound to him in a carefully planned way so that he can cope with it.

Saturation or Structure with Peripheral Disorders?

It is said that children will learn in spite of everything. This is rather a gross exaggeration. However, if it is true of any children within our "deaf-blind" group, it is true of those children with predominantly peripheral disorders. Given a child with a fair amount of residual, peripheral hearing—we can proceed from the point of view of saturation with sound and feel quite confident that the child will learn. Structure is needed more in the more difficult areas in which the child is really pushing his auditory ability to its limits of discrimination—in speech discrimination exercises for example. But generally, the concept of structure with these children who are able to listen, who are curious, who can easily remember having heard sounds and can assign some meaning to sound quite easily, who are cooperative and alert,—with this group of children, the concept of structure is a less important one.

Structure and Perceptual Disorders

We have mentioned those children who have difficulty paying attention to any one sound. Their auditory attention jumps. When we present many sounds at any one time to these children—or many sounds in a short span of time—their hearing-mechanism becomes, in a sense, overloaded. They become more and more distracted because there are so many sounds happening in a short span of time, and all requiring their attention. They become "higher" and "higher" emotionally.

Structure in this situation is imperative. We must consider such things as:

—Cutting out street sounds and unnecessary background sounds which might vie with their attention to the speech in the classroom. Choice of classroom location is important.
—In severe cases, varying the intensity of our voices to maintain attention to speech—from moderately loud to a sudden whisper—is sometimes helpful.
—We must be alert to and eliminate such distractions as scratches on records.
—We must often alert the child to listen—by calling his name before speaking, for example.
—We need to establish firm rules of behavior for him.
—We need to be aware of the possibility of delayed responses.
—Exercises with noisemaking toys, or with any kind of sound, need to be made clear-cut for him. He needs to know what to pay attention to. He needs to know what is expected of

him. He needs to learn correct patterns of response and of behaviour.

—Sometimes, a soft background of constant music is helpful in blotting out background noises.

—The teacher needs to be alert to the child's wandering attention. She needs to know what he is thinking at any moment in order to make the most of his attention if it can be made constructive or in order to redirect his attention.

—A child of this type who is misbehaving very often will become more confused and more hyperactive and more uncontrolled if he is spoken to with a barrage of angry words. He over-reacts to the tone of voice and also to the stream of auditory stimuli which he cannot cope with. Quiet times are often necessary to calm him.

—Alternation of periods of verbal work and of non-verbal work are frequently helpful.

Structure and Aphasic-like Disorders

The characteristics mentioned above, and the characteristics about to be mentioned in this section, are most likely to be found combined in our children. However, even if the children can listen, can discriminate to a certain extent, and have considerable hearing, the fact that they do not speak without special help indicates the need for a structured approach. If they have this auditory ability to be aware of sounds and to discriminate quite well but have not developed speech—there is obviously a reason. And the reason is very possibly that the speech-environment is too confusing for them. They may even have blocked speech out—have ceased listening to that which makes no sense to them.

The following types of structure in language presentation are useful—vital—for any child of this general type—whether you call him aphasic or merely slow in verbal language:

—Simultaneity: He needs to have a word presented precisely at the time he is experiencing that action, object, idea, thought for which the word stands. He needs clearly defined associations set up for him.

—He needs to have language simplified. Too many words confuse him. He needs few words—and innumerable repetitions. He has trouble with meaning. Cutting down language to its barest essentials makes associations easier and meaning clearer.

—He has trouble taking in many auditory stimuli quickly. Use a slow, clear delivery in speech.

—Again, be prepared for delayed responses.
—Use the other senses as crutches for the auditory.

Structure and Emotional Disorders

The question of how much of a child's inadequate behaviour is a result of organic, brain dysfunction and how much is a result of a psychological disorder due to a deficient emotional climate at home produces quite heated discussions in our Department.

The emotional disorders which we describe fall into two broad categories: aggressive and withdrawn. The aggressive children are, in a way, reacting to the environment, but it is in a way which is detrimental to their learning. Somehow (and just "how" involves a moment of truth between you and the child!) this type of child must be quieted so that he can meet the world more coherently, more gently, more knowingly. Before this takes place, much of our presentation of sensory stimuli is lost energy.

The withdrawn, passive children, on the other hand, are simply not reacting to the environment. They occupy space in the world. They participate little. Their level of frustration is usually amazingly low, however.

Supposedly, structure does not help a disturbed child. A child who is emotionally disturbed—but sensorily intact—and who cannot perform under usual circumstances, cannot perform even when the situation is simplified for him. Our experience with our withdrawn children in the Department has been to the contrary.

Whatever the reason may be, children in our Department who find great difficulty in cooperating, in relating to people, in using the abilities which they might have, seem to be able to be positively approached through structured, teaching exercises. It is obviously true that you must somehow, as a teacher, begin relating to this child. You cannot do it verbally, as is the approach with disturbed, hearing children. You must do it on the basis of concrete activity. The child needs success in positive patterns of behavior. He probably never has done anything "right". Through simplification—through structure—concrete, beginning, educational activities can make the basis for a relationship combining support from the teacher with successful responses on the part of the child. Through the structured approach, it is made clear to the child exactly what is expected of him—and that which is expected is within the realm of his ability. Structure provides stability and success—both of which he undoubtedly has had little previous experience with.

GROSS SOUNDS

Gross sounds are those sounds made by toys which make noises, by a record player—without recognition of the sound in any way as music—or by the human voice in a non-symbolic way. Environmental sounds are also gross sounds but will be treated in the following section separately.

Formal lessons based upon gross sounds are useful for creating an initial sound awareness, a listening attitude, the beginnings of auditory discrimination. With the noisemaking toys, sound and sound-source are readily demonstrated and repeated at will. The exercise is easily controlled.

In the case of very deaf children, response may be a purely kinesthetic awareness of loud sounds rather than hearing as such. The importance of this type of response should not be belittled. Hearing actually is a highly organized tactual sense. And to draw the line between hearing and feeling at high intensity levels is nearly impossible, and really an academic question. Increased kinesthetic awareness and discrimination are invaluable to the child with practically no usable hearing. The development of the kinesthetic sense partially compensates for the lack of hearing as such and, in itself, provides important clues to environmental goings-on.

The training of hearing with gross sounds, then, is a basic foundation for progress in the other facets of utilization of sound—environmental sound, musical sound and speech. As well as developing requisite habits of listening in the child, work with gross sounds also provides excellent material and occasion for helping the teacher to estimate the amount of hearing a child has. One must decide how much to demand, how much to amplify or not to amplify, and how much to expect in the way of auditory response. However, while in the very process of determining this, one must already be teaching and training the hearing. Diagnosis, finally, comes through teaching.

When working in the initial stages of building sound awareness and gross discrimination, you must consider whether or not the sounds you are using are loud enough to override the estimated hearing loss and whether or not the frequency make-up of the toys is such that it is reaching the child. Imagine the confusion of a child who is instructed to respond to a sound of which he is totally unaware. The situation would be equivalent to asking a blind child to discriminate between red and green.

This problem, in most cases, is minimal—since most children obviously respond to some sounds in one way or another and one can begin working with these. However, it does become a real problem and one which plagues the teacher in the case of children who are completely unresponsive to sound. These children appear to hear nothing; in fact, they appear to be too deaf to be deaf. There are three points to consider in coping with this unresponsive child. In the first place, one should use gross sounds with him which have power concentrated in the lower frequencies. Assuming that he does have a peripheral hearing loss, any residual hearing which he might have would most likely be in the lower frequencies. Secondly, one should use sounds which are quite loud. And, thirdly, one must ask questions about his behaviour—innumerable questions, which will lead you to clues about his potential auditory ability. What is his voice quality? How does he use his voice? Is he never responsive to sound? Is he responsive only to some sounds? If so, what do those sounds have in common? Loudness level? Frequency make-up? Familiarity and meaningfulness to the child? Do they always have to be foreground or background sounds? Does he sometimes seem to hear rather moderately loud sounds—although you couldn't be really sure? Does he hear something one time and not for several times thereafter? Is he distractible? And so on.

Characteristics of Noisemaking Toys

In a way which is quite analogous to speech sounds, noisemakers encompass a wide range of frequencies with energy concentrated at certain frequencies, giving the different character to each noisemaker. Intensities also vary. Noisemakers can be obtained having a minimum intensity of perhaps 10 db re .0002 dynes/cm^2 or a maximum of 100 db. Due to the wide range of sounds available it should be possible to introduce some noisemakers which every child, no matter how little his residual hearing, could appreciate.

Table I is a list[1] of some of the noisemaking toys commonly used in the Department. The decibel notations are, of course, approximate at each frequency, since most of the soundings will vary somewhat from one time to another. The intensities are those of what was judged to be an average sounding at a distance of one foot. Each decibel notation represents the level of intensity—or the level of hearing—which can be reached by the particular toy at the particular frequency. In other words, taking the first toy listed (the horn), when sounded at a distance of one foot from the child's ear, a

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[1] This data was assembled by the Research Laboratory of Electronics at M.I.T., Cambridge, Mass. in August 1961 through the courtesy of Mr. Kenneth N. Stevens.

Noisemaking toys can be useful for learning about a child's ability to hear and to listen and to use sound, and simultaneously for training him to do so.

—Frequency—

Toy	*250*	*500*	*1000*	*2000*	*4000*	*8000*
Blow horn	40 db	80+	80+	80	80	70
Halloween rattle	0	40	75	70	75	70
School Bell (lge.)	20	35	60	70	85	85
Halloween clacker	30	55	60	70	75	75
Cow bell	15	35	60	70	75	75
Rabbit	—	10	55	60	70	70
Triangle	15	30	40	50	65	70
Sm. Schl. bell	10	25	40	50	60	70
Wooden clacker	10	25	40	50	55	50?
Maraca	10	20	40	50	55	60+?
Sandpaper	—	15	35	40	50	50
Triple bell	—	—	20	40	55	50
Lge. cricket	—	5	20	35	30	20
Sm. cricket	—	—	0	10	30	25
Med. cricket	—	—	—	5	15	10
Drum	45	55	50	50	45	30?

TABLE I

child whose hearing loss exceeds the values listed in the table at each frequency will not be able to hear the horn.

The listing may be helpful in acquainting the teacher with the general characteristics of noisemaking toys. It can perhaps be reassuring in helping us to assess the accuracy of our ear in judging characteristics of toys and environmental sounds. One should accustom oneself to making these judgments regarding sound—estimates as to the possible intensity level and the general frequency characteristics (predominantly high or low frequency). The making of these estimates is necessary in order to choose toys which will be capable of reaching the hearing level of the child with whom we may be working. Not all children can hear all noisemakers.

As can be seen from the Table, even this small group of toys shows quite a range in intensity. Also, concentration of energy at frequency points varies; some toys are stronger in the lower frequencies and some in the higher frequencies. The toys, obviously, can be of use diagnostically as well as in helping children to learn to use their hearing.

Beginning Goals with Gross Sound

The general directions of training at this beginning level are:

—Discrimination between sound and silence; awareness of the presence and absence of sound in a very gross, undifferentiating way.

—Focusing of attention on sound; awareness of sound—thoughtful listening.

—Developing a pleasurable reaction to sound.

—Reaching out toward sound, or moving toward it. This may or may not involve localization depending upon the hearing ability of the child and upon his maturity in general and his experience in general.

—Interest in making sound.

—Gross discrimination: awareness of difference between sounds.

—Beginning of a realization of the meaningfulness of sound.

—Building a curiosity about sound sources.

—Providing opportunities for teacher evaluation of child's hearing in general terms.

—Helping the child toward readiness for a formal, conditioned, audiometric test.

Typical noisemaking toys

ACTIVITIES WITH GROSS SOUNDS

Saturation

Allow the child to have ample opportunity to experiment with objects which make sounds—to play with them and try them out. "Ample" opportunity may be a few days for the alert child with a peripheral loss of a moderate to severe nature; or it may be a period of months or years for a child who is slow or who has a central nervous system disorder, perhaps, in addition to the peripheral loss. The point is this: there is always the possibility that the child has had in the past little opportunity to experience noisemaking toys and needs first of all to establish some sort of nodding-acquaintance with them.

He may not spontaneously play with the toys. You may have to show him how to play. Or, if he refuses to cooperate in this way, *you* play with the toys—looking and acting wonderfully enthusiastic—while he watches. Somehow, involve him in a world of sound-play—and a world of sound which is pointed at him—not a world which ignores him.

Types of Noisemaking Toys

Introduce toys which he is physically capable of sounding himself—although he may not yet be interested in doing this. Rattles and soft, rubber toys to squeeze are easier than music boxes with small cranks to turn. As well as toys which you can work for him, he needs toys with which he might easily produce a sound himself. There are all sorts of rattles (some metal ones are very loud) and rubber toys which squeak. In addition to the types of toys listed in the Table, there are xylophones, bicycle sirens, police whistles, tambourines, and so on, ad infinitum.

Then, there are toys which "do something" in addition to making a sound. These are very often interesting to the children because they usually incorporate movement in some way. Children who are auditorily distractible—and also visually or tactually distractible—are more likely to attend to an object which produces movement. These moving, sound-making toys can interest both the blind and the sight-saving student. There are such toys as "wind-ups"—chickens that hop, cars that run, frogs that jump, monkeys which move in various ways, dolls which roll over, and so on. The enjoyment of the child over the movement of the toy entices him to want to play with it. Meanwhile, the toy is making its noise. In this way, through repeated, pleasurable association, the child may come to learn his first response to a sound. These toy sounds are non-demanding: No response from the child is requested to sound. When heard, they mean "fun" to him.

Awareness of Presence and Absence of Sound

His awareness of sound may first come through play with the toys—or it may come through your shouting "no" at him for the innumerable things which he does which he shouldn't do. Or it can come through the use of music and records.

With the aid of a record player and a vigorous record, you might draw his attention to what happens when you lift the needle from the record, indicating that there is no sound. Allow him to look and/or feel what is going on for a considerable time at first. Have him indicate "no sound" while looking, listening and feeling. Then attempt to have him indicate "no sound" using only his hearing. "Sound" and "no sound" could be indicated by marching, singing, pretending to sleep, standing up, playing musical chairs, dancing, holding up his hand, and so on.

Awareness of other types of sounds which can be sustained may also be used—drums, music boxes, the piano, singing, a horn.

The length of presentation of the sound may be important. If it is too short, he may not be able to "tune in"; if it is too long, he may lose interest. Also, some children can notice better when the sound is gone rather than when it comes. Watch the child; read his reactions and mold the activity accordingly.

Conditioning to a Sound

Children who are especially unresponsive to sound, who show no interest in noisemaking toys but who are still not convincingly totally deaf, can sometimes profit from an artificial, conditioning situation with sound. This is useful diagnostically—and may make it possible for the child to make his first positive, outward reaction to sound.

A sound can in some way be associated with something to which he already responds positively. For example, a loud bell is rung every day when it is time to go to recess. Call his attention to the ringing of the bell, also tactually and/or visually. He, hopefully, will come to anticipate going to recess at the ringing of the bell—and one day will respond purely auditorily to it. Or, a bell or other noisemaker of some kind can be attached to a favorite toy which he carries around with him. Hopefully, through hearing it over and over, it will unconsciously become familiar enough to him so that one day later this bell may be used to call him to come and get his favorite toy. In these ways, we hope to establish a certain usefulness and meaningfulness to sound.

Discrimination

Before discrimination exercises can be begun, interest in sound must be present and the child must be familiar with the toys being used. He must in some evident way be responsive to sound before he can tell the difference between two sounds.

At first, encourage the use of all the available senses in discrimination, only gradually working toward a purely auditory response. For example, have the child match noisemakers by form with the sound accompanying the experience at first. You sound it; then give it to him; he finds one like it in a box; sounds it, and pairs the two toys. This is sometimes necessary so that familiarity with the process can be established and so that he can become more familiar with the sources of the sounds. It also makes possible an experience with sound to which he can more easily at first respond correctly. Sound-toy matching can then, at first, begin as object matching with sound.

Once actual differentiation by sound alone is begun, continue with two quite dissimilar sounds. These sounds can be dissimilar in the nature of the frequency characteristics to the extent that the child's hearing will be able to encompass. And they can be dissimilar in character. That is: one toy could make a long, sustained note (a horn); another contrasting one could make a sharp, quick report (drum, cricket). Once this can be done, the activity can be increased in complexity by adding another toy, and gradually more,—and by decreasing the dissimilarity between sounds used.

Basic procedure for building auditory discrimination responses through formal exercises:

Readiness: Child becomes familiar with the toys by playing with them for a long period of time prior to the beginning of formal exercises with them.

Exercises:
1. Child watches while teacher sounds toys to be used.
2. Child sounds toys briefly. Child then keeps one set of toys and teacher keeps one set.
3. Teacher sounds a toy out of sight of child.
4. Child picks out from his set the object he thinks was sounded, and sounds it himself. The child

must of course be helped to do this at first. The teacher, with animation, can demonstrate what she wants him to do; then she takes his hand and shows him how she wants him to do it; eventually he will do it all by himself and the procedure is established.

5. Reward him. If he chooses correctly, tell him so in some meaningful way. If he is wrong, repeat the sound while he watches; then help him to make the correct response.

Auditory Memory

Determination of the number of times an auditory stimulus occurs requires attention and memory for sound, as well as a nonsymbolic sense of number which is not related to perception (visually or tactually) of quantity of objects. The ability to understand speech requires the ability to remember sounds.

As a beginning, to distinguish between one sound or beat and many sounds or beats is easier. Later, 2, 3, 4, and so on may be reproduced. Sounds used for these exercises may be those such as hand clapping, drum beats, horn sounds, a clacker, and so on. Nonsense syllables may be used later in the same way. The procedure is, of course, for the teacher to make a sound of a particular number of beats and for the child to make the same sound with his instrument. He should be helped to make his sound exactly the same in the beginning. He must be helped to perform correctly in the beginning.

In another type of exercise, two different toys may be sounded in a sequence for the child to reproduce. And various quite complicated patterns of sound can be made in this way.

Localization of Sounds

A beginning in localization can be made by sounding noisemakers to the right or to the left of the child in "reaching out" exercises. Through this exercise, an initial estimate as to the balance between ears may be made.

If he can localize sounds near him, this ability may possibly be extended. The distance from him can be increased until he perhaps can use the sound to walk toward you across the room with considerable accuracy.

Remember that in order to be able to localize sound with accuracy, you must have similar hearing in both ears. A person with good hearing in only one ear has great difficulty in localizing sounds; and, in fact, can only really localize with the help of visual clues or environmental clues.

Also, some sounds are easier to localize than other sounds—depending upon such things as the loudness and frequency composite of the sound, upon the actual location of the sound in relation to the listener, and upon the relationship of hearing ability at different frequencies in the listener. Because a child can localize one sound does not mean that he can localize every sound he hears.

Exercises in localization are extremely helpful for the child who is severely visually handicapped. However, one must be careful to be realistic about expectations.

ENVIRONMENTAL SOUNDS

Hearing is a distance sense. The hearing of sounds around us tells us what is happening beyond the range of our sight. Through hearing, through recognition of sounds experienced and understood before, we can anticipate happenings. Hearing of known, familiar background sounds gives us a sense of stability and security—the security of routine, familiar, predictable events.

The auditorily handicapped child must become familiar with as many environmental sounds as he is capable of hearing and must be carefully shown the source of the sounds in order for him to 1) assign meaning to sounds which will enable him to use them as clues to happenings in his environment which are beyond the reach of his deficient sight or touch, and 2) for his contact with the world to be enriched, thus decreasing his physical and psychological isolation from the world a bit.

It is necessary for the teacher to make use of every available opportunity, in the natural, daily situations—anywhere and at any time. The teacher must become sound conscious. The child must, in turn, become forever conscious of and curious about any sound which reaches him. No sound is insignificant. Sound happens as a result of physical movement of something concrete, and therefore every sound tells of something that is happening in the concrete world. Not every sound is important at every moment. But every sound can be important at some moment.

When the child notices a sound, show him what caused it. Repeat it for him if possible. Allow him to make it himself if possible. He should have frequent opportunities to experience any sound to which he has reacted so that he may retain the meaning of it.

In addition, the child who has a severe, peripheral hearing loss can often profit from learning that things he "sees" are often also accompanied by sound. In this way, he may understand better other people's reactions and certain aspects of language itself which we will discuss later.

Following is a list of only some of the infinite variety of common environmental sounds which a child may encounter. He should become thoroughly acquainted with as many as his hearing permits. These sounds are listed in three groupings which are rather arbitrary but based vaguely on the level of hearing needed to perceive them with the use of amplification. However, the factors involved in perception at any particular moment with a particular child are obviously innumerable depending upon nearness to the sound source, momentary volume of the sound, over-all frequency make-up of the sound, the peculiar pattern of the child's hearing loss.

The list is presented primarily to point out the obvious but important fact that environmental sounds differ in intensity, and that a child may be able to hear some environmental sounds but not others. The greater his loss, the less sound plays a part in his concept of happenings in the world. It also is intended to provoke the teacher's imagination in thinking of the infinite variety of sounds ever present around us with which the child may become, to some extent, profitably familiar.

Moderate loss

- clock ticking
- water flushing
- milk pouring
- dripping water
- snapping fingers
- knock at door
- fire bell
- airplane—in air
- water down drain
- meat frying
- paper tearing
- pencil sharpener
- walking on hard floor
- radio at "normal" level
- door bell
- refrigerator hum
- corn popping
- human sounds:
  - cough
  - sneeze
  - laugh
  - whistle
  - man's voice
  - woman's voice
  - group of voices
  - singing

Severe loss

- human sounds:
  - group singing
  - loud shouts
  - baby crying
- thunder
- airplane motor on ground
- vacuum cleaner
- telephone
- clatter of dishes
- animal sounds:
  - nearby dog barking
- clapping
- truck motor
- music—a band
- alarm clock
- typewriter
- saws
- shoveling snow
- piano
- auto horn
- objects dropped on wooden floor or desk
- subway
- radio at "louder then average" level

Profound loss

- chapel organ
- audience applauding
- fire engine siren nearby
- heavy objects dropped on hard floor
- door banging
- large, deep, tower bell nearby

MUSICAL SOUND

There are certain facts and thoughts about music which can help us to understand better how children with hearing disorders can appreciate it and find music a profitable, educational experience.

Music and Peripheral Hearing Losses

From the point of view of deafness, with moderate residual hearing only at 250 and 500 cps, melodies of tunes—if they are made loud enough—can be perceived. On the piano, middle C is 256 cps and the C above middle C is 512 cps. However, the lack of hearing at the other frequencies would undoubtedly create some deviation from the way in which the normal ear hears a melody.

Perception of the harmony of music may not be possible with high frequency losses. It is the higher frequencies which give music its color, richness and variety.

Our heart beat is always with us, so the appeal of the rhythm of music comes naturally to us. Rhythm, again, is carried by the lower frequencies. So, the rhythms of excitement, sadness, light happiness, peace and so on can be appreciated by the severely deaf. It can become as vital, basic and pleasurable an experience for them as it is for hearing people.

Creation of music—the playing of rhythms and melodies, and singing—is very much a part of every human being. As the creation of anything which is directly one's own or stems from within oneself is mysteriously satisfying, so is the making of rhythm and song. It is relaxing and rejuvenating. Deaf children with peripheral losses up to perhaps 60-70 db can appreciate the making of music—and perhaps of singing. The making of rhythmic patterns on drums can be appreciated even by those children with very minimal hearing in the lower frequencies.

Speech—as does music—has rhythm, pitch, variations in intensity. However, the rhythm of speech is—in general—somewhat more complex than is the rhythm of music as generally experienced by the layman. The rhythm of speech is less predictable, less well-structured than is the rhythm of music. However, the refinement of the ability to make auditory discriminations in music can be preparation for differentiation between the elements of and patterns of speech. The development of an awareness of rhythm, volume, and pitch as demonstrated and learned through music can provide a background for the ability to recognize and produce variations of tone, accent, and rhythm in speech.

It is true that these concepts can be developed directly in speech imitation through the use of the Vibration Technique, without working with music at all. However, it is felt that this sort of work with music is a pleasurable experience, that it provides variety for the child, that it provides a means for early establishment of the basic concepts—before speech has actually begun. Through elimination of other factors of concern such as interpretation of meaning and articulation accuracy, the child is given through music a simplified opportunity to attend to the development of these concepts.

One note of caution must be made. The teaching of these concepts of rhythm, volume and pitch is of little value to the child as far as speech is concerned, unless he is helped to extend the concepts to include the human voice. This transfer of concepts to speech sounds must be consciously planned for by the teacher. It must be taught.

How is this transfer of concepts to speech accomplished? 1) A physical response is first taught in association with a concept. For example, in establishing an idea of volume, the child may be taught to clap his hands loudly in response to a loud chord and softly in response to a soft one. Or he learns to stretch high for a high note, and so on. 2) After a beginning has been made in speech, the physical response is replaced with an oral one. The child says "bu" loudly and softly in response to the familiar events on the piano. 3) Then he attempts to respond directly to a volume change in the human voice, by imitating teacher's voice with his voice. 4) He is then able to respond to a request for a change of volume in his own voice without the aid of a piano or of a model to imitate. Thus established, a concept is his to be forever used and practiced in speech with the aid of the auditory sense and the Vibration Technique. Refinements of the concept can later be illustrated on the piano for clarification and reinforcement if the need arises.

Most assuredly in this particular area, every deaf child can profit. This is true because the nature of the material makes it possible—and desirable—to elicit auditory and tactual responses (kinesthetic awareness of the vibrations produced by sound). The ability of a child with a peripheral hearing loss to use these two related types of clues together is our ultimate aim. We are striving for integration of all appropriate sensory capacities.

One must always be reassessing whether or not the goals one is setting for a particular child in a particular activity are realistic. In working with him, remember always what he may be hearing and how he may be hearing. Be realistic about what he is and is not physiologically capable of doing.

Music and Central Disorders

Many children who are referred to us might be described as over-responsive to music (to phonographs or to radios, actually) and under-responsive to speech. These children are generally very withdrawn. They occasionally may sing or hum tunes, although they do not use words meaningfully or only to a very limited extent. They obviously have a significant amount of hearing in order to react as they do to the music and in order to produce hummed tunes with the often-seen accuracy in tone and melody. But this hearing is not used to make contact with the environment in general.

Educational prognosis with these children is thought to be poor. Progress is slow. Teachers become easily—and understandably—discouraged. Consequently, to my knowledge, none of these children have yet been carried for any significant length of time in a consistent educational-therapeutic program. On the basis of limited experience, one can only present some random thoughts and a few suggestions for auditory approach and understanding.

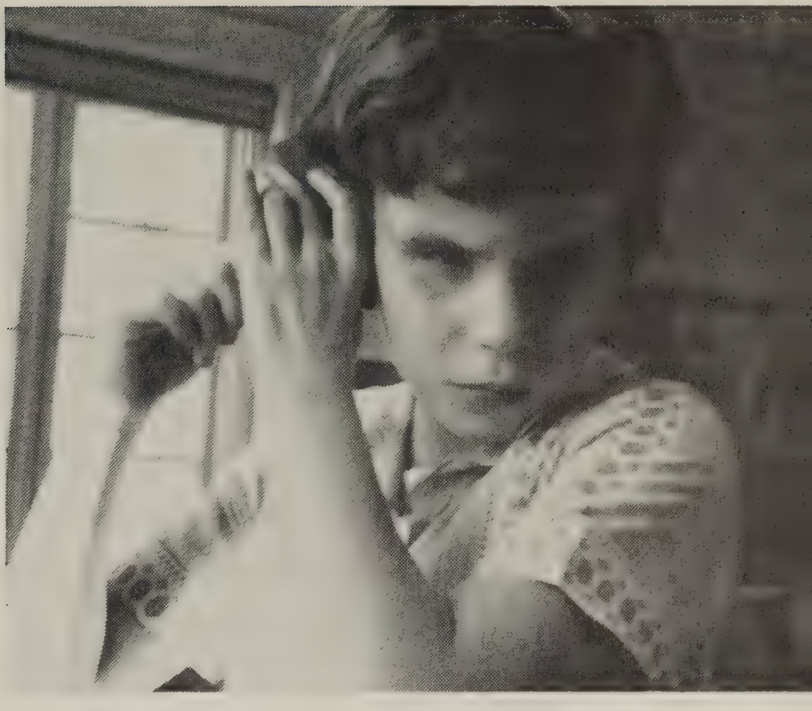
Radios talk. Radios demand nothing from the listener. Through radio listening, a child can have the pleasure of auditory stimuli—without the radio's asking that the child respond in any way—not in appreciation and not in understanding. Radio or phonograph listening is a passive, non-demanding experience, entirely controllable by the child.

Consider this, then. A child has ample hearing. He likes to hear—but he has difficulty understanding, perhaps. Sound is confusing to him, although pleasurable. Mother wants him to understand. She thinks that it's time he began understanding and speaking. She, in one way or another, asks him to understand and to respond. He can't—so he makes a friend of the radio which asks nothing of him but gives to him.

Music is soothing. Rhythm is soothing. A baby is quieted and comforted by rhythmic rocking. Many of these radio-loving children—even if they don't hum or sing—make rhythmic verbal sounds in time with their rhythmic, physical rockings from one foot to the other and so on. Perhaps this is basically comforting in a confusing, small, and frustrating world. It's quite like thumb-sucking, perhaps.

Music is a pleasurable experience, non-demanding, soothing. If the child is rather unresponsive in general—withdrawn, hardly play-

Be aware—actually beware—of passive listening. The music box demands nothing of this little girl. She turns the crank. She listens. She is happy. But what is she really learning in this way?



ful at all, Mother worries about him. She doesn't know what to do for him or with him. But she does hold him on her lap and, logically, rocks and hums or sings to him. He likes it. He feels warm and comfortable. To him singing becomes a happy time, a warm time when Mother is nice to him, a time when Mother is with him. Singing becomes a way of relating—a way of relating in a positive way.

Or Mother simply doesn't know what to do to keep him "out of her hair". He seems to like radios and sound in general, so she makes a habit of putting him in front of the radio or phonograph and urges him not to wander around. He learns well.

Whatever else we may not know about why these children react in such a way to music, we do know—without doubt—that they do like it. And in most cases one must really search to find anything else they like. So then, this love for music must somehow be used in making contact with the child—but it must be used through a human being, not through a radio or phonograph. If you want him to notice you, act like him. Imitate his sounds, his singing. Sing for him. Accept singing as the initial way of relating. Use singing commands even. Use singing to teach simple language—by acting out songs. Later, use singing as reward time.

For the most part, these children won't need the musical activities described in this section. These children have good perception of pitch, of rhythm, of melodies, pitch and intensity variations and so on. Their difficulty is in relating more effectively to sound and in using the sound which comes to them.

ACTIVITIES WITH MUSICAL SOUND

Rhythm and Accent

Imitation of Simple Rhythmic Patterns: Using a drum, simple rhythms may be demonstrated and later imitated by the child. Examples: **1** 2 **1** 2; **1** 2 3 4 **1** 2 3 4; **1** 2 3 **1** 2 3; 1 **2** 1 **2**.

Descriptive Music: Using first the piano and, later, simple records of appropriate music, rhythmic action may be used as a response in discriminating between the different rhythmic and tonal patterns. For example, music may be chosen which is appropriate for such as the following actions: marching, running, skipping, dancing, tiptoeing, swaying.

Basic Rhythms—Discrimination: When presenting simple songs and rhythms by piano or record, 1) always let the child listen for a few measures before asking him to respond by beating the time (by clapping, for example). You must give him time to orient himself to the beat before asking him to tell you. 2) Present a new rhythm on the piano somewhat slowly at first, gradually working up to regular tempo. 3) Introduce such basic rhythms as 2/4, 3/4, 4/4, 6/8—which you have already worked on in simplified form with the drum exercises.

Margaret Kent (12) suggests the following procedure:

a. Illustrate rhythm with one chord (C E G for example), playing in slower tempo at first and greatly emphasizing the first beat. Show the child how to tap the piano lightly with one hand, emphasizing the first beat. At first, allow him to use all the sensory avenues available to him—looking, listening, and feeling. Later, encourage him to only listen—if he has any auditory ability at all.
b. Increase the tempo and repeat the above exercise.
c. Introduce a simple tune which illustrates the time and repeat the exercise.
d. Introduce a second rhythm in the same manner.
e. Contrast the two, having the child indicate which one is being played. If the child is merely guessing, or really doesn't appreciate what is being asked of him, and consequently is making more wrong answers than right,—then you must help him to notice this thing called "rhythm". You must play the chords for him, and show him over and over which is the indicated rhythm. Show him in any way

you can possibly imagine. Remember, if he is constantly making mistakes—if he is constantly making responses which are wrong, he is learning—but he is learning incorrectly. This should be remembered in every activity of any kind in which you are asking a child to make a response—particularly when he must make a choice of several possible responses which are evident.

f. Compare the two by quickly changing from one to the other.

g. Incorporate oral response when possible, such as, counting in time or using nonsense syllables—**pum** pum pum, or **la** la **la** la.

Recognition of Familiar Song-Games: Activity songs are very useful for discrimination of song patterns, for appreciation of rhythm, and so on. Examples of these are:

Ring Around the Rosy
Lazy Mary
Mulberry Bush
Farmer in the Dell
London Bridge
Round and Round the Village
Lobbie Loo
Ten Little Indians
This is the Way We ____.

The songs are acted out through simple activities which in some way—through finger play, or dancing, or pantomime, or play with objects—describe the words.

The songs are most effective if they can be played on a piano (and perhaps taped) simply, slowly, and distinctly. Commercial recordings may be used at a more advanced level.

With many children, for whom over-verbalization without clear associations is detrimental, or for whom structured language experiences are demanded, it is more advisable to make up your own song words using the standard well-known tunes. In this way, more concrete language can be used involving the child more meaningfully and profitably in the activity.

Some songs convert very easily to more concrete, meaningful language:

1. Ten Little Indians becomes Ten Little Fingers.
2. This is the Way We _____ do almost anything: pat your

head, tickle your nose, clap your hands, jump—jump—jump, hold up your arms, make a fist, open your hand, and so on.

3. Round and Round the Village becomes:
   Round and round the table.
   Round and round the table.
   Round and round the table.
   And then we jump, jump, jump (or all fall down, or the like).
4. Lobbie Loo becomes:
   Here we go skipping 'round.
   Here we go skipping 'round.
   Here we go skipping 'round.
   La lala la lala la.
   You hold your right foot up (later, left foot, right arm, left arm).
   You put your right foot down.
   You give your right foot a shake, shake, shake.
   And turn yourself around.
   You bend and touch your toes.
   And then you touch your nose.
   You give your hands a clap, clap, clap.
   And stand up on your toes.

——and so on.

Innumerable songs can be created which are quite easily and vividly acted out and which are simple enough to be understood by the children quite early in their learning of verbal language.

Accent Work: Introduction to Speech Area: The concept of accent in speech can be begun in work with nonsense syllables. Begin the first lesson with a piano exercise: recognition of the number of chords which are played—one, three, two and so on. Then the child is helped to imitate nonsense syllables in different groups: fa, fafa, bu bububu, and so on.

After number, attention is drawn to the length of the sound. Long and short chords are played on the piano, while a motor response is made to each—such as drawing a line until the chord stops. Then contrast two chords. Then make combinations of them. After the child can recognize the difference, have him respond with sustained nonsense syllables illustrating the piano chord pattern. For example, the following chord patterns might be played and uttered: faaaaaaaaaa; fa; faaaaaaaafa; fafafaaaaaaaaa; and so on.

Debbie explores the nature of sound by learning something about where piano sounds come from. Learning to listen to patterns of music can sharpen her listening for patterns of speech sounds.

It may be possible for some children to soon pick out the rhythmic pattern of a simple song, doing it line by line, or phrase by phrase, and pointing out points of emphasis, such as:

a. "Jesus Loves Me": **La** la la la **La** la la
La la la la **La** la la, etc.
b. "Baa Baa Black Sheep": **Ba** ba ba ba
Ba ba baba ba, etc.

It may actually be possible for some children to produce simple tunes with the rhythm.

Volume

Evaluation: Through the results of audiometric testing and through observation of responses to various noisemaking toys, to the piano, and to general sounds in the environment, a knowledge of the child's general auditory acuity will have been obtained, so that the teacher can be aware of the volume changes which the child will be able to note.

Imitation: Using the piano, play a loud, deep chord—or single note; then play the same chord softly in contrast, allowing the child to watch. Have the child play the chord in imitation. Use another chord and proceed similarly. Of course, emphasis is upon the volume, not the accuracy of the child's rendition of the chord. Through actual imitation, the child is exposed to the idea of greater force producing greater volume.

Discrimination: Using one chord only, do the following. Develop a motor response to "loud" and "soft", such as stamping the foot very hard or very gently, or opening the arms very wide or just a little. Then contrast the loud and soft having the child indicate which was played—first through your direction and then independently. Then, build combinations of loud and soft for him to indicate: loud-soft; loud-soft-loud; etc. An oral response may then be possible, using nonsense syllables in response—spoken loudly or softly in accordance with the chords played.

Pitch

Evaluation: Be fully aware of the child's pattern of hearing. Use sounds only within the child's range of hearing. Remember that a child with a loss of hearing—although he may hear a sound—may perceive it not at all as you do. With a high frequency loss, his perception of pitch changes may be greatly reduced, or may be somewhat different from yours.

Imitation: Play a low chord allowing the child to watch and to play it himself. Carry out the same procedure with a high chord. Associate a physical response with each, such as reaching high and stooping low, or pointing to approximately where the chord was played on the piano.

Discrimination: Contrast the two chords with the child only listening and have the child indicate where each was played. Then have him make another type of motor response to it, disassociated from the piano. Later, make up combinations of high and low chords. When this is achieved, follow a similar procedure with chords less different in pitch, and even later with single notes.

Discrimination of Other Sounds: Indicate high and low in reference to sounds produced by other musical instruments, such as the flute (high) and the tuba (low), or the violin (high) and the cello (low), or to voices—a high woman's voice and a low man's voice.

Provide occasional opportunities to experiment with, listen to, and discriminate between the sounds of real musical instruments: a guitar, recorder, piano, drum and so on.

Recordings of instruments may be used in discrimination exercises after the children have become somewhat familiar with the instruments themselves. After the instruments have been associated with their sounds and with pictures or miniatures, these latter may be used in responses.

SPEECH

Speech—as Sounds

The English language is composed of about forty phonemes—forty unique sounds. It is the arrangements of these sounds—the sequences of these sounds, along with pauses, accent, rhythm, pitch and loudness, which make up speech as we hear it. In order to appreciate the effect which any particular type of deafness has on hearing for speech, one must know a bit about the nature of these speech sounds.

A speech sound—any phoneme—is a band of frequencies with concentration or special energy at certain points. The particular points of concentration of energy and the range of the frequency band make one phoneme sound different from another.

If a child cannot hear certain frequencies, the speech sounds containing those frequencies will sound quite different to him than they do to you. It's rather like seeing the American flag without the red in it, for example. Or if a child can hear only a very limited range of frequencies, he may be able to tell when a sound is happening but be unable to discriminate between many sounds. Because he cannot perceive so many of the components of sounds, sounds tend to sound more alike to him than they do to you.

Vowels are composed of more lower frequencies than are consonants. For this reason, children with severe hearing losses such as we encounter are more likely to be able to be aware of vowel sounds than they are of most consonant sounds. If a child has only a small amount of residual hearing, it is most likely to be in the lower frequencies.

Consonants have important high frequency components—up to 6000 cps—which are critical for their intelligibility. Therefore, a child may be able to hear consonants because he picks up the low frequency components in them, but may be unable to discriminate between them because he is missing the higher, differentiating frequencies. Unvoiced consonants have really no low frequency components at all—that is, none below approximately 2000 cps.

Not all speech sounds are of the same strength. Conversation happens at about 60 to 70 db. According to Dale (4), the difference between the loudest and softest sounds in normal conversation is about 20 db; consonants are about 10 to 15 db weaker than vowels. So, once again, vowels are more likely to be perceived by our more deaf children.

Speech sounds happen over a period of time. They happen in sequence. A gross sound happens "bang" most generally—a door bangs, dishes rattle, a dog barks, a horn beeps, a book falls, and so on. These sounds are noises—many frequencies occurring together, simultaneously. Speech, on the other hand, is more sophisticated. Speech is a series of sounds being presented one after another in changing combinations—forty sounds being presented in different relationships to each other over a period of time. The child has to be able to remember sounds just gone by and relate them to sounds about to come; he has to pay attention, make associations, make fine discriminations between the individual sounds and more discriminations between the sequences of sounds. If you appreciate the intricacies of the task, it may be easier to simplify the task somewhat for the child.

Introduction to Procedures

Our goal in auditory training in speech is the maximum development of the individual's ability to use the combined senses in an integrative way for the best possible understanding of speech and for the building of the most intelligible speech possible from any individual child. The actual emphasis in training upon the auditory component of speech will vary with the individual child, depending upon the quantity and quality of his residual hearing ability and upon the over-all combinations of his multiple handicaps.

Depending upon the combination of handicaps present and upon the over-all intellectual ability of the child, a child may be predominantly visually, or tactually, or auditorily oriented. One of these sensory modes will take the lead—naturally—in the child's responses to the world. The remaining sensory modes will supplement the primary one. This must be respected in auditory training. Speech may be responded to primarily through deficient vision, or hearing or touch. Our goal is to educate the supplementary senses to support the dominant sense in every way possible.

Specific, formal exercises with hearing are important initially for a variety of reasons. Hearing is sharpened by drawing attention to hearing. The child is helped to notice similarities and differences—in volume, in pitch and inflection, in rhythm and accent, and in articulation—which he might otherwise have missed. Concepts are made clearer by separating speech from language for certain exercises. Attention is then called to the sound of speech, not to the meaning of speech as is usually emphasized more. Concepts are made clear by simplification and contrast. Comparisons are made. Clues are pointed out. Subtle differences are talked about and thought about. Sounds are repeated, in order for them to become familiar. Listening to the sounds of speech becomes a habit.

As ability develops in listening and in discriminating, practice in hearing is carried out more and more informally by giving a minute or so to it perhaps fifteen or twenty times a day. For example, when working on a speech sound or on a word in language, have the child experience the auditory component alone now and then. Later, give him a chance to attempt recognition of the word in contrast to others through hearing alone. Or, after a language story has been developed and is quite familiar, let him experience it through hearing by attempting to follow you as you read it aloud. Then perhaps pick out sentences from the auditory clues alone, or phrases or isolated words. Or when teaching him a new word, give him many opportunities to listen to the word only. You must say to him—in these ways—on innumerable occasions: Listen!

Do not isolate the auditory in specific exercises until the child has experienced the particular stimulus through all of his sensory capacities. For example, no record, rhyme, story, sentence, word or speech sound should be used in specifically auditorily oriented exercises until an adequate foundation and understanding has been laid for the particular concept in language. For auditory exercises involving specific comparisons or specific discriminations, use only familiar, well-known language.

In normal conversation, the child will be visually and/or tactually in contact as well as auditorily. Therefore, one works for a pure auditory response in isolation only in order to direct attention momentarily to the auditory, thereby sharpening auditory awareness and the auditory impression.

Initially, auditory perception of speech is trained and practiced in a quiet, structured situation. After a good foundation is formed and listening habits are founded and utilized well, the child should be exposed to auditory perception under less ideal conditions—in noisy situations, in situations involving distractions, and so on.

RELATIONSHIP OF HEARING TO THE VIBRATION METHOD

Traditionally, the Vibration Technique has been the method for the teaching of speech and speechreading in the Perkins' Deaf-Blind Department. With the higher incidence of auditory disorders other than simple peripheral losses, we have made a closer examination of the Vibration Technique and have concluded that the Technique is indispensable with some of our children, helpful with most of the remaining group, and not helpful with a small group. Our method is to use touch, residual sight and residual hearing in appreciation of speech. The extent to which one of these senses takes the lead in the appreciation of speech depends upon the individual child and upon his particular combination of disorders.

The Vibration Technique

The Vibration Technique utilizes the sense of touch in the hand to take note of certain aspects of speech which can be felt on the mouth and face. The sense of touch can appreciate voice and voicelessness, breath, movements of the mouth, and to some extent placement of the tongue.

The hand of the "listener" is placed on the face of the speaker with the thumb lightly placed on the speaker's lips and fingers spread on the cheek and upper neck. Small children may more easily use two hands, one on the lips and cheek and one on the neck and cheek.

When attempts are made to form beginning speech—rather than speech understandings—one hand of the child is placed on the face of the speaker; the other hand is placed on his own face. In this way, the child is able to monitor his own attempts at speech.

"Vibration" and the Deaf-Blind

"Vibration" is the only means of appreciating speech for those children who are severely handicapped both visually and auditorily. These are the children whose sense of touch is the leading sense—the dominant sense—and whose residual hearing may be used only to provide added clues whenever possible.

The child who has truly oriented himself to the world through the tactual sense is the child who benefits most, and most easily, from "Vibration". The process of imitation of speech becomes quite clear to him since he, by placing one hand on the speaker's face and one hand on his own face, is matching tactual impressions to tactual

Conversation is truly the sharing of personal ideas. True communication is listening, telling, thinking, learning new words, learning new ideas. Elizabeth uses her partial vision, partial hearing, sense of touch —and in fact her whole self in conversing with her teacher.

impressions. This is, for example, in contrast to the sighted deaf child who is taught to speechread visually. The sighted deaf child sees speech and, usually, has to attempt to imitate it only through feeling it as he produces it; he is receiving visually, but monitoring kinesthetically—unless he has a mirror always available.

The tactually oriented, very deaf and very blind child, through the Vibration Technique can achieve very good speech—often better in quality than that of the average deaf child, if he is started early, if he has average intelligence and if he is predisposed to want to communicate with people.

"Vibration" and the Partially-Sighted, Deaf Child

The child who has very little hearing but quite a loss of sight uses Vibration in a different way. This child is usually primarily visually oriented. Therefore, hearing and touch become supplementary senses. This child, usually, does not as readily "take" to "Vibration". He is often impatient with it at the beginning. But, through training, he can learn to use "Vibration" to improve his speech. "Vibration" adds many valuable clues—of breath, of volume, of voice—which simply are not available through sight nor through defective, incomplete hearing patterns.

The partially-sighted, deaf child will, first. look—but he can be trained to also feel and to listen, with the residual hearing which he might have, in order to enrich his sensory impression of the world and in order to enrich his sensory impressions of speech.

"Vibration" and the Hard-of-Hearing, Visually-Handicapped Child

This child listens—but he hears indistinctly and incompletely. "Vibration" is indispensable to him. It helps him to fill in those areas of speech which his ear cannot properly appreciate. The ear will, nearly always, take the lead, but touch is used in a very important, supplementary way. In the beginning years, the child will rely more on touch than he will later,—particularly in learning speech correctly.

We often have children with little or no sight who have a steeply sloping, high frequency loss. "Vibration" is indispensable to these children who are congenitally handicapped in order to have available more complete patterns of speech to imitate. Once speech and language are very well established, "Vibration" may be relied on much less since the child, through training, will be able to pick up much of speech through the auditory and will, from this, be able to make "educated guesses" about the rest.

"Vibration" and Auditory Disorders of the Central Nervous System

The advisability of using "Vibration" with children in whom there are disorders operant other than—or in addition to—peripheral hearing losses is a matter to be decided by individual, diagnostic teaching.

The child who does not respond to sound generally, but who is not peripherally deaf: Primarily, we want to avoid concentrating on and selling ourselves so completely on "Vibration" that we forget to explore to its fullest extent the possibility of utilizing and training hearing. As this entire pamphlet is saying, do not believe that simply because a child does not today respond to sound, he is deaf. And, consequently, do not believe that if a child, today, does not respond to sound, you should always rely entirely on "Vibration".

"Vibration" is limiting in space. That is, you can only read "Vibrations" when you can touch the speaker. Hearing is far-reaching; hearing can potentially function beyond the length of your arm. In addition, speech is sound, basically, and there are auditory aspects of speech which simply cannot be appreciated by touch or by sight. For these reasons, if it is at all possible to "resurrect" unused hearing potential, it is a project which is tremendously worthwhile.

Over-concentration on the "Vibration Technique", too hasty belief that a child who does not now respond to sound is totally deaf, too hasty abandonment of auditory training, and the change in your environmental use of speech with a child whom you believe cannot hear at all,—all of these attitudes may result in fostering deafness in a child who actually has some practically usable auditory potential which he could use with concentrated training.

The child who is auditorily or visually distractible: Focusing attention on the mouth through placement of the hand often helps distractible children to concentrate their attention on speech—although they are potentially capable of appreciating most of the auditory components of speech through their hearing.

In this case, however, touch is used only as a temporary attention-getter or as a temporary crutch to call attention to the auditory. If "Vibration" is helpful to this child, use it; but also remember that our primary interest is in using the auditory to its fullest extent.

"Vibration" and Symbolic Disorders

Quite obviously, "Vibration" is not the answer to symbolic disorders. If the child does not have the cerebral ability to symbolize, "Vibration" will have little effect. "Vibration" only makes available tactually the sensory impressions making up speech. These impressions must then be recorded in the brain, remembered, compared, recalled, and interpreted in order to be useful for purposes of communication.

If it becomes evident that a child is particularly slow in language—that the child has a particular deficiency in ability to acquire and use language symbols for communication—then one must evaluate the particular child's sensory make-up and sensory response, in order to determine which of the various methods of receiving communication will be most easily acquired by him.

"Vibration" and the Emotionally Disturbed Child

"Vibration" requires very close contact between the child and the teacher. A child who does not respond positively to people,—or —more strongly—who rejects human relationships of interaction, will not easily tolerate putting his hand on his teacher's face. Go gently with him, even if you have decided that he cannot appreciate speech without vibration. Build up rapport with him on a level of play and side-by-side tasks before you ask him to pay attention to your speech. Speaking near his ear may be intolerable enough for him at first—and is a better introduction to speech for him than is tactual contact which must be forced.

Remember also that the disturbed child possibly has relinquished the use of his hearing—that is, has rejected human speech—and the solution to the difficulty is not going to come through simply exposing him to speech through another sense. A child must respond to human beings before he will respond positively to speech—whether it be speech through hearing or speech through sight or touch.

Summary

For the very deaf and very blind, "Vibration" provides the primary and indispensable means of appreciating speech.

For the hard-of-hearing, partially-sighted, "Vibration" provides an indispensable, complementary means of learning speech and provides a corrective method. However, the child is generally primarily auditorily oriented.

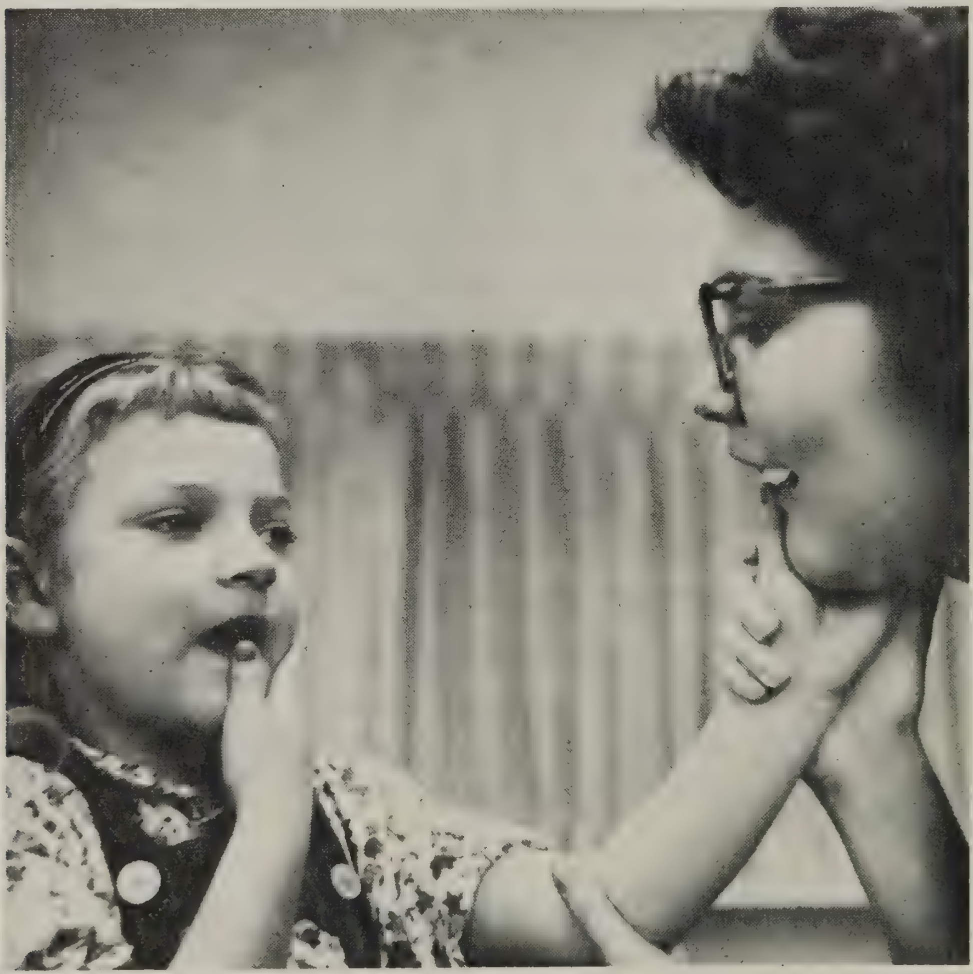
For the hard-of-hearing blind, "Vibration" provides a complementary means of understanding speech and of learning speech.

For the young child who gives no auditory response, for the autistic-like child, "Vibration" is not forced. It is used only willingly, naturally and playfully, pointing out only the interesting qualities of sound. Equally, auditory stimuli in the environment are emphasized. Time and the response will determine whether auditory or tactual avenues will become primary.

For the child who is auditorily distractible, "Vibration" often is a focusing method—a method of helping him to pay attention to the foreground speech in the beginning stages of training.

For the child who rejects "Vibration", for the somewhat disturbed child, rapport must be established before "Vibration" can be evaluated. The child's negative response is not to "Vibration" as such but to communication in general.

Within our group of children, we change our primary emphasis in speech from primarily tactual to primarily auditory and to any point between these two extremes, with any residual vision as a supplement. As a beginning point, equal thought is given to training of hearing and to training of touch—training, observation, diagnosis determine the emphasis later placed upon each.



Vibration technique

ACTIVITIES IN SPEECH

Awareness of Voice

The alert, peripherally deaf child will usually be aware of voice used by others and of the possibility of his own voice for useful purposes, such as calling attention to himself, quite early and without specific training. However, our more complex children—various types of whom we have mentioned off and on—will not develop awareness of voices around them with facility. The following techniques may be helpful in initially building attention to voice:

a. Talk to him, using simple, and few words. Repeat key words. Speak a bit more loudly than usual. Speak a bit more slowly and distinctly. Talk to him about what he is doing and thinking about. Pay particular attention to opportunities for repeatedly reinforcing words meaningfully, such as shouting "no" at a misbehaviour across the room and then approaching him to urge him to stop. Call his name when you want him—before you go to him and get him.
b. He may enjoy singing. Hold him on your lap and sing near his ear, perhaps bouncing him, playing horsey or another simple rhythmic game at the same time.
c. Imitate any sounds he makes, and carefully observe his reactions. This has often been a way of first reaching rather disturbed children auditorily and also rather slow children.
d. Use odd, playful vocal sounds with him. For example, "brrrrrr" on his neck when cuddling him; "wheeeeeee" when tossing him into the air; "oooooooooo" with inflection just for fun. If he is inclined to make rhythmic vocalizations himself, then you make these also off and on; make small, rhythmic, sing-song patterns with a few simple syllables.
e. Taping his vocalizations and playing them back to him may present possibilities for calling his attention to voice.

Beginning Gross Discriminations in Speech

Initial, formal exercises with voice should involve training the child to listen for voice and to make a response to voice. This is especially true with children who have considerable hearing, but who have particular difficulty in attending to sound and also particular difficulty in language in general—gestural as well as oral.

These exercises need to be made as simple as possible so that the child can as easily as possible respond correctly. For example, initially, you can simply train the child to perform a motor task when you make a sound; such as, using a cone tree which the child has already motorically mastered, placing the disks in a box, and prohibiting the child from reaching in and taking the next disk until you say something like "take a disk". Or, have the child pull off a large plastic bead from a "string" of them, only when you say "pull". Or, have a large basket of balls from which the child may throw them, one at a time, as far as he can, but only when you say "throw it".

The object of these exercises is to train the child to inhibit his responses, and to train him to listen for voice as a stimulus requiring a response from him. Up to this point, he is being given only one verbal command during any of these exercises; therefore, he need not be able to distinguish between verbal commands; and, actually, he need not yet realize the element of communication yet.

The next step is to help him choose between two possible vocal stimuli and two motor activities. The words used for the two activities should be, initially, as different in sound and in length from each other as possible, in order to make the task just as simple as possible and to help the child to respond correctly faster. For example, one could use the string of plastic beads and the cone tree. The commands would be "pull" or "take a disk", and these would be given in an irregular, alternating fashion. The child need only distinguish between the one syllable-ness of the "pull" and the three syllable-ness of the second command. In other words, he need only grasp the very general auditory impression in order to be able to discriminate.

This type of exercise can be very frustrating for the hyperactive child who has great difficulty controlling his impulses. He may need a very long period of carefully guided instruction before he can, all by himself, choose the correct motor task indicated. Do not allow this type of exercise—or any other—to deteriorate into a guessing game. If he can only respond alone by guessing, then he needs to have more repetitions, with your guidance, of making the correct response.

It might be possible to incorporate voice as a gross sound in discrimination exercises with noisemakers. For example, using a tom-tom, a horn and a vocal sound which the child can make—such as his own "ungalunggalunggalung", it is the job of the child to indicate which sound was made by which instrument, and possibly to reproduce the sound pattern.

Vowel Discrimination

As we have already mentioned, vowels are somewhat more powerful than consonants and also have more low frequency components than do consonants. For these reasons, with severely auditorily handicapped children, it is wiser to begin with the vowel sounds in attempting finer discrimination since it is these sounds which will be most easily discriminated by the greatest number of children. Ability to discriminate between vowel sounds is a testing ground for ability to discriminate between consonants and will give an indication to the teacher of the child's discrimination potential.

Animal Sounds: Conventionally, vocal representations of animal sounds are used in conjunction with toy animals or pictures of animals in discriminating exercises in many programs for the deaf on the beginning level. The value and motivation of this sort of exercise with blind children are dubious since pictorial representations cannot be used and since toy models are very often simply not recognizable to the, as yet, non-verbal blind child. However, the exercise may be motivating to a partially-sighted child, if the teacher uses some ingenuity and imagination.

The sounds are associated with their picture-animals. Then these are used in games of discrimination and matching. Following are examples of some of these sounds:

baa baa—sheep
moo—cow
peep—chicken
bow-wow—dog
oink—pig
hoooo—owl
meow—cat
coooo—pigeon

Toy Sounds: The sounds made by representations of real objects can be used in a similar way. For example:

choo choo—train
tick tock—clock
toot toot—car
bang bang—gun
boom boom—drum

In exercises with both animal sounds and toy sounds, simple combinations of speech sounds are used to represent the sounds made by the objects; in other words, the representative speech sounds—boom boom, peep, etc.—are used to draw attention to the fact that these objects—the cat, the gun, the train—do make noises which are distinctive. However, it would seem that greater worth can be found ultimately in concentrating one's focus and energy on the actual, real sounds produced by the train, the cow, the drum and so on, and upon the names of the objects themselves as possibilities for exercises in auditory discrimination, rather than upon these artificial representations of the sounds.

Auditory Vowel Discrimination in Speech Refinement: When working for better, more accurate production of individual sounds, also emphasize—in addition to the multi-sensory impression—the auditory impression alone. The child should have opportunities, over and over again, to listen to the speech sounds—while not looking and not feeling.

When familiarity with several vowels is well-established, these may be used in discrimination exercises with hearing alone. Remember, if the child cannot accomplish the discrimination through hearing alone, then return once again to the multi-sensory impression alternated with the auditory impression. Speaking the vowel in his ear often draws his attention better to the auditory impression.

Vowel Discrimination in Conjunction with Language: After words have been thoroughly mastered—that is, after the meaning of oral words is understood through multi-sensory impressions, these words may then be used to train auditory discrimination and auditory attention. In other words, as soon as the child can definitely respond appropriately to object words, such as ball, balloon, shoe, top, and so on, then use these words and objects, giving only the auditory clues. Can he auditorily discriminate between ball and shoe and cup? Emphasis at this time will be upon the more grossly differing vowel sound, or upon the contrasting syllable count rather than upon any more subtle discriminations.

After oral language development is well on the way, exercises contrasting words with the same initial and final sounds but with different vowel sounds may be used. These point up the necessity for accurate vowel production.

Examples: feel—fall
sat—sit
gave—give
ten—tin
far—fur
read—red
throw—threw
came—come
heel—hill
pin—pan
take—took
blow—blew
ate—eat
hope—home
ran—run
soap—soup
ball—boil

Consonant Discrimination

Following are some possible activities involving fine discriminations between consonant sounds. The specific use of these exercises must be left to the discretion of the teacher who must evaluate the potential ability of her student. The object is to draw the child's attention to differences between sound—auditory differences which he can appreciate, in conjunction with the tactual and visual differences.

Discrimination between voiced and voiceless consonant sounds in nonsense syllables and in words: Occasional exercises with nonsense syllables are useful because the element of tension over and concentration on language understanding is thus eliminated, and more focus can be placed on the sounds themselves. Examples: a) p-b, b) t-d, c) k-g

Discrimination between voiced consonant sounds with long vowel sounds in nonsense syllables and in words.

Examples: bar—boo—bee
dar—doo—dee
thar—thoo—thee

Discrimination between breath consonants with long vowels in nonsense syllables and words: shar, sar, par, tar, kar, far.

Make different combinations of the above nonsense syllables for imitation through hearing alone: bardoo, shooshee, sharsoofee.

Word Discrimination

Although we have mentioned already exercises involving words, we will treat words now separately in order to point out the development in discrimination which occurs in speech as a whole. Following are several sequential exercises:

a. Give very dissimilar words in the beginning, such as a one syllable word and a two or three syllable word, involving very different sounds: airplane—top; bounce the ball—jump.
b. Discriminate between words of the same number of syllables but with different vowel sounds: run—march; airplane—ice cream.
c. Using pictures or objects, have the child respond to sentences involving discrimination of the words, at first using touch and/or sight and hearing to recognize the words,

and later using hearing only. Example: Where is the baby? Where is her hat? Show me mother.

d. Make a list of familiar words—on the blackboard or in Braille. Teacher then uses each in a sentence orally. The child listens and tells which word was used. Or, the child may be able to indicate the word spoken alone, if it is possible for him auditorily to get enough clues out of context. Or, read down a list of words, have the child follow by listening only and following down his own list, and have him tell you where you stop. This type of exercise encourages him to be syllable conscious as well as sound conscious and encourages him to make the most of every clue.

e. Constantly orient the child toward listening to the auditory component of new words and old words. Isolate the auditory experience at frequent intervals throughout the day, in addition to the drills used now and then. Give him throughout the day, at odd intervals, opportunities to experience and to discriminate between words which have been stressed auditorily.

Phrase Discrimination

Carry out a similar procedure with phrases as that used previously in "Word Discrimination". Concentrate on auditory recognition of familiar phrases occurring during the work of the day.

Examples: Color: the red car, the blue and green dress.
Number: six balloons.
Combinations: four, black birds.
Compound nouns: a ball and a top, Mary and David.
Time: at six thirty, in half an hour, when she came.
Place: at the store, between the two boxes.
Familiar phrases: Hello. How are you? Where are you going? How many? Thank you. Who was it?

Sentence Discrimination

Carry out a procedure similar to "Word Discrimination". Do exercises involving auditory recognition correlated with reading, speechreading exercises, and general language activity. For example, the teacher reads two or three sentences of a story while the children listen and follow the printed page. Then she may repeat specific words, phrases, or sentences for the child to discriminate auditorily.

Specific drill work on commands, questions and familiar expressions may be helpful. A list of a particular group of expressions may be made up and the child asked to tell which is said through auditory discrimination.

Accent

Following is a sequential list of activities for building awareness of accent:

a. Develop the ability to recognize accent in syllables.
    1. Review in correlation with musical sounds, using nonsense syllables to respond to rhythmic patterns on the piano, the drum, etc.
    2. Imitate rhythmic nonsense syllables directly without the piano: bu′bu, bubu′, bububu′, bu′bubu, bubu′bu. Similarly, use other syllables: pum, loo, du, and so on. Then use combinations of different syllables: barboo, lapum′, and so on.

b. Use familiar words with different number of syllables for discrimination. Have the child clap the syllables, or tap them out. Examples: ball′—air′plane; car′—bi′cycle; ba′by—bana′na. The stressed syllable should be indicated in the clapping.

c. Develop the ability to recognize and produce accent in familiar phrases and expressions. Example: Thank′ you. Where are you go′ing?

d. Explanation and practice with the resulting change in meaning as accent is moved from one word to another.

    Example: I′ found it. —I found′ it.
    How are′ you? —How are you′?
    We′ ate it. —We ate′ it.

e. Develop the ability, through practice and explanation, of accent and pauses, to produce a freely flowing sentence, building it up from the rhythm of phrases. Example: May I have′—a cup of coffee? *NOT* May-I-have-a-cup-of-coffee?

Often, tapping on the child's arm is helpful in pointing out the emphasis needed orally to achieve accent. Also, movement of the fist to emphasize the accented syllable is helpful. However, very much time and opportunity should be given—in addition to noticing tactual and visual clues—to the auditory impression of rhythm and accent. Very many children can auditorily appreciate accent, when they really have minimal ability to actually discriminate between sounds or to understand language by ear alone.

Pitch Discrimination and Inflection

Changes in inflection affect the meaning of words and sentences, as well as giving a certain color to speech. Following are a series of exemplary activities involving pitch:

a. Practice changes in pitch, having the child respond with a high and low vowel sound to illustrate chord combinations of high and low pitch on the piano.
Children with residual sight are often helped by using simple diagrams of pitch changes on the board. These are illustrated below. Blind children may be helped by using similar movements of the arm in place of the visual representations.

b. Imitate a high pitched and a low pitched sound which the teacher makes with her voice. Initially, make the differences of pitch extreme—very high and very low. The point now is to make a dramatic contrast to draw the child's attention to the very idea of pitch change. "Vibration" is very helpful in this regard.
Diagrammed examples:

a(r) a(r)
/ \
a(r) a(r)

c. Other combinations of pitch changes of a vowel sound:

oo oo oo oo
/ \ / \ /
oo oo oo—oo oo

d. Practice with continuous up and down pitch changes—similar to a fire engine sound for example:

oo
/ \
oo oo

e. Practice familiar phrases using different inflections:

are Morn
/ \ / \
How you? Good ing.

f. Work for awareness of and development of inflection in simple conversation:

I went to the mov′ go?
\ /
ies. Where did you

g. Discrimination between voice qualities in general: Using actual experiences and, later, recordings, discriminate between men's and women's voices and children's voices. When language and speech have developed enough, the voices of story characters can perhaps be attempted if enough residual hearing is present to appreciate the differences. These must be first illustrated by the teacher, and then attempted by the student. Examples: The light, delicate voice of the beautiful heroine; the deep, gruff voice of the villain; the rapidly spoken, angry voice. This is a very advanced exercise, and will be possible only for a very few children in our group.

Volume

Through a review of the exercises involving volume with the piano, develop an understanding of the words "loud" and "soft". Practice changes in volume of the voice in imitation of the teacher. The need for these changes in volume should be explained to the children when this becomes possible from the point of view of language. For example: whispering; speaking to the person next to you; speaking above an unusually noisy background, such as in shop classes; speaking to a person across the room; cheering at a game; shouting to someone far away.

SUMMARY AND AFTERTHOUGHTS

No book, however complete, reveals the author's entire feelings and ideas.

The following pages contain fascinating additional thoughts expressed by Nan Robbins in a highly personal manner.

E. J. W.

In attempting to deal with the problem of helping children to use their inadequate hearing better, the focus in this pamphlet has been on "defective hearing ability". But perhaps that focus, though useful and inevitable, is not the whole story educationally. Perhaps, by thinking in this way, we make the children much more "different" than they are and much more static in behaviour than they actually are. And consequently, we find them more confusing to teach than they actually are. By writing a pamphlet in this way, hearing becomes much more of an isolated area of functioning than could realistically be true.

For example, think in terms of your own fluctuating hearing and listening ability.

There is sound happening. And there is me. I have "normal" hearing. What I hear depends upon the sound itself and upon me at any one moment in my life. "Me" is my past experience carried within me in my present self. And of course my present self is different at each new moment.

Sometimes I listen. Sometimes I do not. Sometimes I react to sound. Sometimes I am passive. Sometimes I hear—but do not listen. Sometimes I do not hear.—Why?

Sometimes I do not listen because I do not hear. The sound itself may be too quiet to reach me. Maybe you can hear the sound because you are closer to it than I. Or maybe you do not hear the sound because your ears do not function normally. Maybe you are deaf or hard-of-hearing.

Hearing is a distance sense. Hearing puts me in touch with the world outside of myself. Then, is it not logical that if I am now only interested in Me, sound in the background will concern me only in a limited way?

So sometimes I do not listen because the sound has nothing to do with me. I hear the sounds—but I only listen to some. I only pay attention to those sounds which affect me now—and particularly to some of those which have affected me in the past. This was true also when I was very young. Later, I became curious about sound—and often would look around at the happening of a new sound. And of course as I became able to walk around, to move about and to encounter more things, my world grew larger. I grew larger in spirit. I was able to notice sounds farther away from me. First I was interested only in sounds which in some way were associated with satisfaction of my immediate wants. And sometimes I was startled by sound.

Sometimes, I don't listen because I am all me. And nothing outside of me, unless it has direct benefit to me is even noticed. When I was little, I wanted to be fed, or held or maybe bounced up and down. I didn't notice color, or form, or sound as such, but as part of the activity of being fed or going-to-be-fed, and so on. I was aware of color or sound or form in so far as it was associated with the object or person with which I had interacted in a way which was immediately rewarding to me. That is, I noticed sounds if they had been in the past associated with situations with which I had directly to do—not which had to do *to* me or around me. When I am older I can learn about sound without actively participating so much. This is especially true when I can talk about sound. But before that, I have to have something to do with sound to help me to listen and to know.

Now that I am older I still sometimes do not listen because I am being all me, but of course in a slightly different way. I perhaps am thinking very hard; and myself is completely in those inner thoughts. Outside sound is, for the most part then, irrelevant.

Sometimes I just do not want to listen. Something bothers me—about the sound, or about you who makes the sound. Or maybe I have a cold or am anxious or apprehensive and just don't want to be bothered right now. Or maybe I'm just very tired.

Even now, sometimes I listen, but I do not respond outwardly because I haven't heard the sound enough times. I think about the sound. I vaguely remember having heard the sound before. But my involvement with it was only passive though it was nearby. It is familiar—but what does it mean? If someone will help me to know what it means this time, perhaps next time I will remember.

I have learned to expect and ignore some sounds, because they always happen in a given situation. They have always happened; and they are "safe"; and they require no response. I listened to them when they were new, but not any more because they are familiar, and they require me to do nothing. But, add a new sound to this situation, or change the old familiar one just a little, and I'll listen again because it may mean something important. If the sound changes, something else has changed to produce the sound. Does the change affect me? I'll listen until I'm sure.

I have been often, for long periods of time, in a situation in which my friends were speaking a foreign language of which I knew nothing. The conversation often went on around me, since one can only translate so much. And frequently, when the conversation had gone on for a long period of time without involving me, I found myself not listening. Sound—speech—was happening, but I was not hearing it. I was not capable of understanding the speech without help. And they were not really conversing with me. They were requiring nothing from me. I became passive, and learned little of the language. But the moment someone talked to me, expectantly, I listened. I then heard sounds in the language which I had never heard before. I tried to remember. I thought. I tried to understand. I was actively participating. As soon as I became actively involved with the sound, my hearing changed.

I have normal use of my hearing. I can make myself listen to any sound which I want to listen to—the clock tick, the waterpipes banging, the train whistle, the noise of the gas heater, the speech of the person talking to me, whether or not that sound is the most important one at the moment. And—I can *not* listen by concentrating on something else. But it is perhaps impossible for *you* to make me listen. You can only "make" me listen by making the sound important to me in some way.

I can train my hearing. I can make my hearing seem to improve. But really I am only listening better and comparing better. I can "improve" my hearing simply by experiencing sounds in contrast, or by having sounds repeated over and over when I am attentive to them. I can learn to hear subtle variations in sound which originally were nonexistent to me. I can do this easier if someone helps me to associate another sense (color or movement) with each of the sounds in some way in order to intensify the variation.

Lack of response to sound is not always due to deafness and actually varies from moment to moment in each person. I have normal hearing; and sometimes I am not responsive to sound. In fact, sometimes I actually do not hear. The deaf-blind children do not have normal hearing. They may or may not be responsive to sound. But if they are not generally responsive, do not automatically assure yourself that they simply are deaf. My ability to, at any one moment, hear, and a deaf-blind child's ability to hear have to do with all of these things:

—the physical nature of the sound. Sounds, for example, are made up of differing combinations of energy at various frequencies. All human ears are limited in appreciation of frequency. And deaf or hard-of-hearing ears are very limited.

—my physical distance from the sound. The energy of sound diminishes over distance. The sound may have been "loud" at its point of initiation, but by the time it reached me, it had died out.

—my psychological distance from the sound. This involves my development outward from me. The extent to which I am involved with me will determine in part the types or occasions of sound to which I can respond. Development of speech helps me to be much less involved with me. The ability to walk helps me, and interacting with people helps me. Moving and doing also help, as does having an effect on something. The more "me" comes to include other than my immediate physical needs and satisfactions, the more I will notice and be interested in sounds which were once irrelevant.

—the adequacy of my ear for converting sound to electrical signals.

—the adequacy of the auditory pathways of the central nervous system for carrying these electrical units.

—the adequacy of the cortex for storing auditory units; the ability to recall these units when desired; the ability of the system to respond to these signals.

—the frequency of my past experiences with the particular sound and my actual contact with the sound during those times.

—the importance of the sound to me at this particular moment—now—in terms of what I am involved in doing.

—my manner of perceiving at any given moment or at any given general time in my life. At one time I can respond only in terms of immediate sensation, due to the inter-rela-

> tionship of the above and more. In this way, a sound has meaning only in terms of the entire framework in which it has been experienced; I react to a sound-situation in a set way. At other times, I can get away from myself a bit more. Sounds have meaning in and of themselves. And the meanings change from one situation to another although the sound may be, physically, the same. Sounds can produce images, can produce thought—rather than simply a set reaction response. It is only through this development outward that one can be able to use the sound of speech in a truly symbolic, communicative way.

A child with diminished or absent response to auditory stimuli is not just a set of ears to be examined. He is a child with a certain, unique combination of sensory equipment, of intellectual equipment, of past experiences, of emotional and personality development. In these terms each child is truly an individual—unique, and can only be truly understood as such. But, if we then infer from this the idea of the individual program for the individual student, we have perhaps gone wrong and may be left with no program at all.

Sound does occur as a means of communication in this world, from its more gross forms as a signal for an immediate action, to its more sophisticated form of symbolic speech. And there is a development in the human ability to react to sound, which is not governed or understood by study of the ear alone, but through the study of developmental psychology, through the study of the active-growing-being of the normal sighted, hearing child, and the active-growing-being of the somehow different child. Perhaps this is the core—the development of thought, of action, of communication, of being—which can constructively form the longitudinal focus of our entire program. And perhaps hearing, then, can be more realistically viewed and consequently more knowingly utilized in terms of this longitudinal development.

The auditory sense does not function in isolation. When a child progresses in his ability to listen and to understand sound, you can be sure that this progress is not restricted to hearing. Conversely, you can be certain that you will not produce changes in hearing by concentrating purely on hearing alone. Neither will you evaluate hearing level by concentrating on hearing alone. Changes in auditory behaviour are changes in the child. Auditory training is not a school *subject.*

Is it possible that we can go further faster and less frustratingly in the early stages of teaching non-verbal, auditorily deficient children to use their hearing, to react to the world, to learn, by considering their likenesses (not at any one static moment, nor in relation to any age level nor in relation to the type of handicap but in terms of changing ways of experiencing the world) to each other and to normal hearing children in terms of information which any child must note, store, process, and be able to recall appropriately in order to communicate and to survive independently in the world, rather than by focusing attention on the uniqueness of differences or the mystery of deviant behaviour? Their differences are significant and vital to consider in terms of specific, academic techniques or materials or in specific sensory avenues of approach. But their differences are insignificant in terms of information to be dealt with in the world.

This pamphlet has not really dealt with hearing in these terms. But now, just before this pamphlet must go to press, the author hopes to plant these, perhaps new, thoughts in the mind of the reader and to stimulate interest in these ways of thinking.

It is the beginning children who are, in a sense, the greatest problem. A teacher summarized my thinking of the last paragraphs in this way:

> For example, one of our children may be eight years old. But, he may be experiencing—thinking—reacting—in the way of a one to two year old. Normal children of one to two years learn of their own accord; we never think of teaching them; and so, we also really never think about *how* they learn or about how they are really experiencing. But perhaps we need to think about how these young, normal children naturally learn in order to actually clarify our approach to our children.

Let the focus, in helping our children to use their hearing better, be *not* on static, passive, sponge-directed "auditory training", but on bringing about active response to sound from the child, through interaction and through communication, at whatever baby-level his possibility for action may be. He must not be expected to absorb, but to react. And let us learn more about how to promote active responses by learning more about how very young, non-handicapped children develop in perception of the world, and, in terms of this pamphlet, specifically in perception of sound.

APPENDIX
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BIBLIOGRAPHY

APPENDIX

RECORDINGS AND SONGS

Gross Discrimination

1. Beginning awareness of presence of sound:
   Sousa Marches, DL8807.
2. Discrimination of musical rhythm instruments:
   Rhythm Instruments, A 103-5, Rhythms Productions.
3. Gross discrimination of sounds:
   Records accompanying thesis of Jean O'Sullivan, *Auditory Training,* unpublished Master's thesis, Boston University, 1955.

Environmental Sounds

1. *Sounds Around Us,* Scott Foresman and Co., N.Y., 1951.
2. *What's Its Name,* Jean Utley, The Maico Co., Minneapolis (Record 1).
3. *Sounds for Young Readers,* A-E 100, Audio-Ed. Co., Herrick, N. Y. (Side 1).

Musical Sound

1. Examples of possible songs:
   a. Descriptive Music:
      March —This Old Man
      Skipping —Jack and Jill
      Swaying —It's the Loveliest Night of the Year
      Tip-Toeing —Tip Toe Through the Tulips
      Jumping —Pop Goes the Weasel
   b. Basic Rhythms:
      2/4—Yankee Doodle
      3/4—Let Me Call You Sweetheart
      4/4—Jingle Bells
      6/8—Drink to Me Only with Thine Eyes
2. Examples of general, usable record series:
   a. *Children's Rhythms,* Series I and II, Ruth Evans, Box 132, P.O., Branch X, Springfield, Mass.
   b. *Rhythmic Activities:* RCA Victor.

3. Sources for song-games, activity-songs:
    a. Recordings:
        Let's All Join In, CLP-1208.
        A Child's First Record, VL 3625.
    b. Books:
        The Romper Room Book of *Finger Plays and Action Rhymes,* Wonder Books, 627 R.
        The Best Singing Games, Edgar S. Bley, Sterling Publishing Co., N. Y., revised ed. 1960.

Recorded Speech Material

Recorded speech material should be used with caution and with thought. In most cases, commercial recordings are only useful with "deaf-blind" children when a considerable amount of residual hearing is present. Also language development must be quite well developed for the majority of the recordings available. In addition, usually a vast number of experiences are needed to really appreciate most of the recorded material. Generally speaking, then, the auditory perception of speech should be worked on through live voice which can be more easily controlled than can recordings. This control is possible in several ways, since we have the advantage of individual teaching. It is possible in control of vocabulary, in rate of speaking, in ease of repetition, and in ease of providing additional tactual and/or visual clues when needed. Recordings should be used sparingly and thoughtfully with full understanding of the difficulties involved and with full evaluation of their usefulness in the individual situation.

Following are a few examples of recordings which may be helpful with children who have residual hearing enough to appreciate auditorily in some detail a fair amount of language. Of course the recordings and song books listed under "Musical Sound" are also appropriate; however, in this case the emphasis changes from recognition of rhythmic pattern, melody and so on to the understanding of speech itself and its meaning through auditory clues alone.

1. Beginning Language Level: songs involving activities or object play:
    a. *A First Record for Children,* CL 680.
    b. *Nothing to Do,* CRG 1012 B.
    c. *A Child's First Record,* VL 3625, Decca-Vocalion.

2. Intermediate to Advanced Language Levels:
    - a. *Mother Goose Songs,* CU-100.
    - b. *Strike Up the Band,* CRG 5027.
    - c. *A Child's First Record,* VL 3625.
    - d. *Let's Listen,* Auditory Training for Speech Development and Reading Readiness, Bresnaham and Pronovost.
    - e. *What's Its Name?,* Record 2, Jean Utley, The Maico Co., Minneapolis.

Tape Recordings

Teacher-made tape recordings have a wealth of possibilities:

- a. Recordings of the beginning speech sounds of the withdrawn or shy child. Listening to his own sounds is sometimes tremendously impressive to him. These are also useful diagnostically, enabling the teacher to have a repeatable, objective record of the child's changing vocalizations.
- b. Recordings of environmental sounds, which can be set up in a more usable way than is the ordinary record—with longer pauses between, with repetitions if these are desired and so on. Recordings can be made "on the spot" with the child and later used in the classroom. Also a greater variety of sound may be secured.
- c. Recordings of teacher-read stories, to be used for practice study-periods by older children. Language can in this way be better controlled, and there is complete flexibility in story subject and content.
- d. Tape-recordings are sometimes motivating to older children for improvement of their own speech.

Through tapes, recorded material can be tailor-made to fit the abilities and needs of the child—in terms of type of material, rate of presentation, language level, subject material and so on.

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